[DOE LETTERHEAD]

February 2, 1996

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004

Dear Mr. Chairman:

The Department of Energy (DOE) is in the process of final coordination on Revision 1 of the Implementation Plan (IP) for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-6. The IP Focuses on ensuring that the Department maintains the capability to conduct safe dismantlement, modification, assembly, and testing operations. This letter contains the following deliverables as required by the 93-6 IP.

Commitment A.3 (Enclosure 1) - Institutionalize a practice of reviewing the personnel losses at the nuclear weapons laboratories to ascertain if any experts that are knowledgeable in the technical competencies of the safety criteria are projected to be lost through the departure of personnel.

Commitment B.1 (Enclosure 2) - Issue the Knowledge Preservation Program document for the Y-12 Plant and Oak Ridge Operations Office, which describes the steps used to capture and utilize anecdotal safety aspects of quality evaluation, assembly/disassembly, processes, and safety support skills and knowledge.

Commitment C.1 (Enclosure 3) - The Nevada Operations Office will revise NV 56XE.1, Underground Nuclear Testing, to include: (1) an annual qualitative assessment of the critical functional areas, key positions, Job and Task Analyses (JTAs), and personnel of each organization involved in nuclear testing activities to determine whether the descriptions are current and sufficient to meet the Nevada Operations Office mission and to determine if additional, technically competent personnel are required; this assessment will consider information captured in the archiving program and learned from the test exercise program; (2) the development of an annual exercise/activity plan to ensure that key positions, facilities, management systems, and controls are exercised; and (3) an annual completion report of accomplishments in developing and maintaining personnel in key positions and of lessons learned for each exercise or experiment.

Commitment D.1 was included in Recommendation 93-6 Quarterly Report covering the period of October 1 through December 31, 1995.

Should you have any questions, please contact Mr. Richard C. Crowe, Associate Deputy Assistant Secretary for Military Application and Stockpile Management, on (202) 903-4221.

Sincerely,

Everet H. Beckner
Principal Deputy Assistant Secretary for Defense Programs

3 Enclosures:
Commitment A.3
Commitment B.1
Commitment C.1

Weapons Operations - Albuquerque Operations Office

1. Responsibility

The Albuquerque Operations Office (AL) is responsible for the implementation of this task, subject to the final approval and acceptance from the Deputy Assistant Secretary for Military Application and Stockpile Management. Relevant operations office elements, management and operating contractor(s), and the nuclear weapons laboratories will be an integral part of the implementation of this task.

2. Commitment A.3

Institutionalize a practice of reviewing the personnel losses at the nuclear weapons laboratories to ascertain if any experts that are knowledgeable in the technical competencies of the safety criteria are projected to be lost through the departure of personnel.

3. Deliverable

The document institutionalizing a semiannual formal presentation to the Deputy Assistant Secretary for Military Application and Stockpile Management Weapons Panel, which illustrates that the nuclear weapons laboratories and Pantex have conducted personnel reviews to verify that their necessary level of personnel expertise is confirmed.

DOE F 1325.8
(08-93)

United States Government | Department of Energy

memorandum

DATE: JAN 1 1 1996

REPLY TO ATTN OF: DP-24:O'Shaughnessy, 3-7543

SUBJECT: Annual Review of Personnel

TO: Program Director for Nuclear Weapons Technology, Los Alamos National Laboratory

The Defense Nuclear Facilities Safety Board Recommendation 93-6 Implementation Plan (IP) identifies a need to institutionalize a semiannual review to verify that Pantex and the National Laboratories maintain technical personnel necessary to develop and verify that weapon assembly and disassembly processes are safe and predictable.

In view of the Department's downsizing and limited weapon work, it is necessary to closely manage personnel gains and losses to ensure that the technical capabilities necessary for stockpile support are maintained. During the development of the IP for Recommendation 93-6, representatives from the Department of Energy/Albuquerque Operations Office, the National Laboratories and Pantex identified critical capabilities to support nuclear assembly and disassembly operations. They are listed in Appendix A. The National Laboratories and Pantex must assure that they maintain a competent staff, with the correct skill and knowledge mix, to support weapon assembly and disassembly operations.

To keep me informed of the status of your staff's ability to support weapon operations, I am requesting that you provide a report that addresses the strength of your staff in relation to their capability to perform weapon specific activities. I would like to receive this report every 6 months. In order to establish a continuing discussion and examination, I am having your report added as an agenda item for every other Deputy Assistant Secretary for Military Application and Stockpile Support (DASMASS) weapons panel meeting. The report may be of any format you select; however, it should identify personnel strengths and weaknesses in each of the technical competencies associated with weapon assembly and disassembly operations.

An acceptable model for the report would be an update to: The Report to Congress on the Stockpile Stewardship Recruitment and Training Program, dated March 1995. Since this report did not include Pantex, Pantex would need to add expertise in handling High Pressure Components and Special Nuclear Material Components as well as general Occupational Safety and Health Administration topics to this report.

For planning purposes, I intend to have this agenda item added to the June 1996 DASMASS Weapons Panel Meeting. If you have any questions, please contact me or have your staff contact Martin Schoenbauer of my staff at (301)903-3489.

Thomas P. Seitz
Deputy Assistant Secretary for
Military Application and
Stockpile Support
Defense Programs

Attachment

cc w/out attachment:
R. Fisher, DP-10
B. Twining, AL
R. Hagengruber, SNL
G. Miller, LLNL
H. Berman, AAO

Appendix A

- Main Charge High Explosives
  - CHE
  - IHE

- Detonators
  - Primary detonators
  - Electro-explosive devices
  - Pyrotechnic components

- Electrical Design
  - Safety theme
  - Electro-static discharge
  - Electro-magnetic radiation

- High Pressure Components
  - D-T boost systems
  - Work bottles

- SNM Components (Pits and Secondaries)
  - Intrinsic radiation
  - Criticality
  - Packaging and Storage

- Systems Engineering
  - Electro-mechanical systems integration
  - Assembly/disassembly techniques
  - Nuclear explosive safety
  - Testers

- Other Hazardous Components and Materials
  -Depleted uranium, beryllium, thorium, etc.

- General OSHA Concerns
  - Industrial safety and hygiene

DOE F 1325.8
(08-93)

United States Government **Department of Energy**

memorandum

DATE: JAN 1 1 [illegible]

REPLY TO ATTN OF: DP-24:O'Shaughnessy, 3-7543

SUBJECT: Annual Review of Personnel

TO: Associate Director for Defense and Nuclear Technologies, Lawrence Livermore National Laboratory

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United States Government **Department of Energy**

memorandum

DATE: JAN [illegible] 1995

REPLY TO ATTN OF: DP-24:O'Shaughnessy, 3-7543

SUBJECT: Annual Review of Personnel

TO: Vice President of Defense Programs, Sandia National Laboratories

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Defense Programs

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memorandum

DATE: [illegible]

REPLY TO ATTN OF: DP-24:O'Shaughnessy, 3-7543

SUBJECT: Annual Review of Personnel

TO: H.S. Berman, Amarillo Area Office

The Defense Nuclear Facilities Safety Board Recommendation 93-6 Implementation Plan (IP) identifies a need to institutionalize a semiannual review to verify that Pantex and the National Laboratories maintain technical personnel necessary to develop and verify that weapon assembly and disassembly processes are safe and predictable.

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Weapons Operations - Oak Ridge Operations Office

1. Responsibility:

The Manager, Oak Ridge Operations Office, is responsible for the implementation of this task, subject to the final approval and acceptance from the Deputy Assistant Secretary for Military Application and Stockpile Management. Relevant operations office elements, management and operating contractor(s), and the nuclear weapons laboratories will be an integral part of the implementation of this task.

2. Commitment B.1

Issue the Knowledge Preservation Program document for the Y-12 Plant and Oak Ridge Operations Office, which describes the steps used to capture and utilize anecdotal safety aspects of quality evaluation, assembly/disassembly, processes, and safety support skills and knowledge.

3. Deliverable:

Provide a program document, which describes each step of the Knowledge Preservation Program for the Y-12 Plant and Oak Ridge Operations Office.

Y-12

DOCUMENT NUMBER: Y/DA-9370

OAK RIDGE
Y-12
PLANT

MARTIN MARIETTA

THE OAK RIDGE KNOWLEDGE PRESERVATION PROGRAM PLAN FOR THE Y-12 PLANT AND THE DEPARTMENT OF ENERGY OAK RIDGE OPERATIONS OFFICE

July 15, 1995

P. A. Carpenter
Y-12 Site Office
Oak Ridge Operations

M. L. Wetzel
Oak Ridge Institute for Science and Education

S. R. Churnetski
C. M. Davenport
R. W. Vasofsky
J. W. Whittaker
Development Division
Y-12 Plant

MANAGED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

Date of Issue: July 28, 1995

Y/DA-9370

THE OAK RIDGE KNOWLEDGE PRESERVATION PROGRAM PLAN FOR THE Y-12 PLANT AND THE DEPARTMENT OF ENERGY OAK RIDGE OPERATIONS OFFICE

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Prepared by the
Oak Ridge Y-12 Plant
P. O. Box 2009, Oak Ridge, Tennessee 37831
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LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract No. DE-AC05-84OR21400

CONTENTS

THE OAK RIDGE KNOWLEDGE PRESERVATION PROGRAM PLAN FOR THE Y-12 PLANT AND THE DEPARTMENT OF ENERGY OAK RIDGE OPERATIONS OFFICE

I. INTRODUCTION

The Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 93-6 is concerned with mitigating the loss of expertise and safe operations knowledge during the current downsizing of the Nuclear Weapons Complex (NWC), specifically in the areas of weapons testing at the Nevada site and dismantlement at Pantex and the Y-12 Plant. Each affected site has been directed to work with the United States Department of Energy (DOE) to develop a coordinated plan that can be applied across the NWC as appropriate. Consequently, the DOE Oak Ridge Operations (ORO) Y-12 Site Office tasked the Y-12 Plant, in January 1994, to implement a formal Knowledge Preservation Program, specifically related to safety, to preserve processing, disassembly, assembly, and quality evaluation (QE) capabilities. Also, in March 1995, the Y-12 Site Office tasked the ORO Training and Development Division to implement a Knowledge-Capture Project for key federal staff in Oak Ridge.

A review by ORO and the Y-12 Plant of Recommendation 93-6 concluded that the following specific subrecommendations apply to the Y-12 Plant and/or ORO:

1. Initiate a formal process to identify the skills and knowledge needed to develop or verify safe dismantlement or modification procedures that are specific to all remaining types of United States nuclear weapons (including the ability to conduct relevant safety analyses).

2. Institute a practice of reviewing the personnel losses at the nuclear weapons laboratories (including the Y-12 Plant for secondaries) and at the DOE for staff who are engaged in nuclear defense activities to determine what skills and knowledge might be lost through attrition.

3. Negotiate the continued availability (through retention, hiring, consulting, etc.) of personnel scheduled to leave whose skills and knowledge are important.

4. Initiate programs to obtain from such key personnel undocumented, anecdotal, technical information that would be of value in augmenting the technical knowledge and expertise of successors. The information should be obtained and recorded before their departure or soon thereafter.

5. Develop procedures for the safe disassembly of weapons systems while the personnel with system-specific expertise on the original development of the weapons are still available. Likewise, expedite analyses of the possibility of hazard from degradation of remaining nuclear weapons with time.

Subsequent sections of this program plan describe how these subrecommendations are being addressed.

Although a number of activities were already under way at the Y-12 Plant, these activities were not part of a formalized program and were not focused strictly on safety aspects. Therefore, the Y-12 Plant assembled a core team of personnel to staff the Knowledge Preservation Program. This team will determine what information already exists (including procedures, safety documentation, photographs and videos, and expert systems); identify other activities ongoing in the Y-12 Plant that can provide input and be built upon; integrate that information into the program; and focus current and future activities on the capture and preservation of anecdotal knowledge (with an emphasis on safety issues) that has not already been captured. This ongoing program, which is described in Section III of this plan, will identify, capture, make available, and maintain the unique knowledge of individuals. First, the team will address the disassembly process and associated safety support processes, such as criticality safety, radiological control, etc.; then, QE and assembly processes (in that order) will be the next priorities.

A separate process is also under way to identify and interview both incumbent and former employees for key federal staff positions to capture and archive any unique knowledge. A follow-on effort will determine the best use of the captured knowledge to enhance current federal staff. This process is also described in section III.

II. BACKGROUND/PRIOR WORK

Approximately 75 percent of the process knowledge, including approximately 90 percent of the associated safety aspects, at the Y-12 Plant, is already captured in the form of safety authorization basis documents; health and safety Procedures; Criticality Safety Approvals (CSAs); Class I operating procedures; QE photographs, videotapes, and procedures; weapon materials master characterization list, dismantlement procedures, Build Books, and other existing records. To assess the "real time" aging of the canned subassembly stockpile, QE reports from individual weapon teardowns are being reviewed. The surveillance data of specific weapon types are being collected and analyzed to obtain a general assessment of the extent of degradation with time for given canned subassembly weapon types. Both reliability and safety information are being obtained through such analyses, and the information will be considered in establishing long-term canned subassembly storage requirements. In addition, the review is expected to provide feedback to determine the value of particular measurements that have been made during weapon teardowns and to determine if additional measurements are required to enhance the information obtained during future teardowns.

The existence of a substantial amount of documentation on the design and safety aspects of nuclear weapons was recognized and acknowledged by the DNFSB as mentioned in Recommendation 93-6, paragraph 3. Some illustrations of this existing knowledge, as well as examples of previous knowledge-capture efforts at the Y-12 Plant, are described in the following subsections.

A. SAFETY DOCUMENTATION AND PROCEDURES

Health and Safety Procedures

The Health, Safety, and Environmental Accountability Organization provides direction, support, and oversight for the Y-12 Plant. The Health and Safety Program is defined by the 70 Series Procedures, which include procedures for personnel protection, radiation protection, nuclear criticality safety, industrial hygiene, fire protection, waste management, safety analysis review, and environmental affairs. The 70 Series Procedures are undergoing extensive review and revision as part of the Y-12 Plant restart effort. The following sections further describe several of these procedures.

Safety Authorization Basis Documents

The Y-12 Plant Safety Analysis and Review System is governed by the Y-70-800 Series *Health and Safety, Safety Analysis and Review,* of the Y-12 Plant Procedures and the FS-100 and FS-200 Series, *Facility Safety, Safety Analysis and Review,* of the Energy Systems Procedures that form the basis for authorized operation. A safety analysis is a documented process to (1) systematically identify the hazards associated with an operation, facility, or activity; (2) describe and analyze the adequacy of the measures taken to eliminate, control, or mitigate identified hazards; and (3) evaluate the potential risks of operation. The Safety Analysis documents for the Y-12 Plant are being updated through the Safety Analysis Report Update Program (SARUP) that is based on a risk prioritization of activities; thus, the most significant safety aspects of all facilities undergo, in a more timely fashion, the analytic rigor and completeness required for present operations. Until the SARUP is completed, the safety authorization basis for the Y-12 Plant includes Safety Analyses, Hazard Screening documents; Basis for Interim Operation documents; Unreviewed Safety Question Determinations; Operational Safety Requirements documents; and any other documentary basis for interim or permanent operations that assesses safety.

Criticality Safety Approvals

A CSA is a two-part document that contains the request by the operating department for nuclear criticality safety approval of a proposed fissile material activity and the limits and conditions of approval determined by nuclear criticality safety analyses. Personnel from the Nuclear Criticality Safety Department review the operation and determine which parameters need to be controlled. A formal criticality safety analysis is then conducted, and requirements are included in the CSA. Some of the parameters that may be included in the analysis are: mass, density, volume, concentration, reflection, neutron absorption, geometry, interaction, and moderation. All CSA documents are undergoing a major review and upgrading as a result of the restart effort at the Y-12 Plant (DNFSB Recommendation 94-4).

Weapon Assembly Age Degradation Study

The Y-12 Plant has initiated a real time Age Degradation Study and also development of a Canned Secondary Assembly Storage Standard. The data to be studied and the methods

be used are being identified in FY 1995. In FY 1996, the aging study is scheduled to start under the Defense Program's Advanced Design and Production Technology (ADaPT) Program, and data will feed both the QE process and development of storage standards and dismantlement procedures. (See paragraph 2 of a subsequent section, *Quality Evaluation Procedures*, in this document.)

Class I Operating Procedures

The Class I Operating Procedures are historical production procedures for certain critical processes and operations; they are retained in the Y-12 Plant Records office. Current policy mandates that *all operations involving nuclear materials* must have a detailed written procedure. These procedures are undergoing a major review and upgrading as a result of the Y-12 Plant restart effort.

Training Program

The training program is undergoing extensive review and upgrading as a result of DNFSB Recommendation 93-3. A Training Implementation Matrix that identifies key functional positions for the facilities at the Y-12 Plant is being reviewed to define the training modules required for personnel based on their job duties and the frequency of training recertification. These modules include Nuclear Criticality Safety, Hazard Awareness, Fire Safety, and other safety-related training.

B. PROGRAMMATIC PROCEDURES AND REPORTS

Dismantlement Procedures

Dismantlement Procedures are sequential instructions for tearing down specific weapons that exist for some weapon systems or can be extracted from the more-detailed QE Procedures. The procedure review and upgrading is being done on a system-specific basis prioritized by the Y-12 Plant dismantlement schedule so that the appropriate procedures are completed before the dismantlement readiness review for each system. Upgrading the existing dismantlement procedures includes (1) reviewing requirements for personnel and radiation protection, CSA, and hoisting and rigging; (2) reviewing key information from QE teardown films and procedures; (3) reviewing knowledge from personnel who were involved earlier with each weapon system; (4) reviewing for requirements to address material hazards; and (5) improving the procedures as needed. Copies of the dismantlement procedures are maintained in Y-12 Plant Records and by the Disassembly and Storage Organization.

Quality Evaluation Procedures

Quality Evaluation Procedures are detailed procedures for each weapon system produced at the Y-12 Plant that were written at the time of production by teams of design agency and production personnel. Each weapon stockpile has been subjected to periodic sampling and disassembly of units for QE and monitoring. Currently, QE Procedures for the enduring stockpile weapon systems are being reviewed and upgraded as a result of the Y-12

Plant restart process. Upgrading the existing QE procedures includes reviewing CSA, requirements for personnel and radiation protection, and requirements for hoisting and rigging operations; then, revising the procedures as needed. Copies of the QE Procedures are maintained in Y-12 Plant Records and the Quality Evaluation Department.

To assess the "real time" aging of the canned subassembly stockpile, QE reports from individual weapon teardowns are being reviewed. The surveillance data of specific weapon types are being collected and analyzed to obtain a general assessment of the extent of degradation with time for given canned subassembly weapon types. Both reliability and safety information are being obtained through such analysis, and the information will be considered in establishing long-term canned subassembly storage requirements and disassembly procedures development. In addition, the review is expected to provide feedback to determine the value of particular measurements that have been made during weapon teardowns and to determine if additional measurements are required to enhance the information obtained during future teardowns.

Photographs and Videotapes of Quality Evaluation Teardowns for All Weapons

A large bank of photographs and videotapes, which includes many examples of all types of QE teardowns for weapon system assemblies produced at the Y-12 Plant, is maintained by the Quality Evaluation Department.

Build-Book Records

Build-Book records are hard-copy (not electronic media) certification documentation for each War Reserve assembly built at the Y-12 Plant. Included in the Build Book is an Assembly Follow Sheet, leak test and rate measurement strip charts, and dimensional and radiographic inspection results. Printouts of dimensional contour inspection of certain components of the assembly may also be included. Radiographic film of the assembly and component certifications, filed separately from the Build Book, is also available.

Weapon Systems Master Characterization List

The Master Characterization List includes the toxicity and hazard rating of hazardous materials used in each of the weapon assemblies produced at the Y-12 Plant. This list was prepared by collaboration between the Industrial Hygiene Department and the Program Management Organization of the Y-12 Plant. Information from the Master Characterization List is used to identify operational hazards and disposal issues.

C. PREVIOUS KNOWLEDGE-CAPTURE EFFORTS AT THE Y-12 PLANT

Some time ago, the Y-12 Plant recognized the value of capturing the expertise of individuals with knowledge of unique systems and processes. A number of these knowledge-capture projects (including both videotapes and expert systems), which were completed before Recommendation 93-6 was initiated, are listed in the following subsections.

Dr. J. M. Googin Videotapes

The late Dr. J. M. Googin, Senior Corporate Fellow and member of the National Academy of Engineering, was involved in every significant technical problem at the Y-12 Plant from the 1940s until his death in 1993. He either devised or made a major contribution to most of the key production processes and was the premier technical expert on Y-12 Plant operations. Before he died, he made a series of videotapes in three major subject areas: weapons physics, weapons materials, and enriched uranium processing. The videotapes (approximately ten in all) provide much historical data and insights into the reasoning behind the operating processes.

Mr. Herman Butler Videotapes

Herman Butler, a long-term employee in the enriched uranium area, was brought back from retirement on a consulting basis to record as much as possible of his technical expertise and experience. The information from a series of interviews was organized by topic in a hypertext medium.

Automatically Programmed Metrology Expert System

The Automatically Programmed Metrology (APM) expert system takes the dimensional data of a given machined part that must be inspected to close tolerances on the contour, analyzes the part shape for its similarity to known cases, and produces a set of instructions for inspecting the part. Captured knowledge is used to decide how many points to take and in what locations. Expert knowledge is applied in deciding how to handle unusual features of the machined part such as slots, grooves, and holes. The output of the program can be fed to other programs that produce a downloadable inspection machine code.

Rolling Information Generation System Expert System

The Rolling Information Generation System (RIGS) generates rolling mill instructions for producing plate and part-blank stock from uranium and uranium-alloy billets. The billet temperature, the reduction per pass, the orientation of the billet on succeeding passes, and other factors must be carefully controlled to produce a plate or blank with the desired metallurgical properties. This activity is highly specialized in uranium operations and was performed until recently by one planning expert who is now retired. The RIGS program captures a large part of the expert's knowledge and makes it available to less-experienced planners. Metallurgical engineering knowledge was also incorporated into the program such that it is now considered more skilled than even the subject matter expert.

Traced Oralloy Casting Advisor Expert System

The Traced Oralloy Casting Advisor (TOCA) produces instructions for making Oralloy castings with uniform loadings of trace elements. It selects the material types, forms, and amounts, specifies the furnace type and temperature profile, selects the form for pouring the billet, and specifies the quenching and cooling conditions. This activity was previously handled by one experienced engineer, using heuristic knowledge accumulated over 40 years.

Hydroforming Tool Design Advisor Expert System

The Hydroforming Tool Design Advisor (HTDA) is an expert system for generating instructions to fabricate large (up to 32-inch diameter) metal forms and mandrels for use in hydroforming metal parts operations. The system selects the form material or alloy and metallurgical preparation, specifies the fabrication process (machining, forging, etc.), and lists the fabrication parameters (temperature profile, quenching, etc.). The HTDA captures the practical knowledge accumulated by a relatively few engineers over 40 years.

Maintenance Importance Generator Expert System

The Maintenance Importance Generator (MIG) is an expert system for advising maintenance planners on the order of working the extensive backlog of Y-12 Plant Maintenance jobs (approximately 20,000). It incorporates knowledge of DOE and local policy and captures the expertise and best practices of many individuals both in Maintenance and throughout the Y-12 Plant. Safety is the main objective of the MIG system, and safety-related jobs are specifically marked and highlighted. The MIG program is a formal part of the Y-12 Plant Conduct of Facility Operations procedures and has been used to answer many auditors' demands for a systematic, consistently applied method for identifying critical job issues—such as safety—and for prioritizing work.

III. PROGRAM PLAN

Appendix A is a process flow diagram of the Oak Ridge Knowledge Preservation Program for the Y-12 Plant (Steps 1 through 11) and ORO (Steps 12 through 15). Each step in the process flow, which is described in the following section, will be completed first for disassembly operations and associated safety support processes and then for QE and weapon modifications processes. Activities, which are under way in several of the steps, will continue to be worked concurrently as resources are available.

A. PROCESS FLOW FOR THE Y-12 PLANT

Step 1: Identify Key Positions for Each Facility from the Y-12 Plant Training Implementation Matrix

As part of DNFSB Recommendation 93-3, the Y-12 Plant developed a Training Implementation Matrix (TIM) , and key positions were identified for each of the Y-12 Plant facilities. The key positions will be incorporated into the Knowledge Preservation Program and reviewed against the preliminary list of key operational safety positions (Step 3).

Step 2: Perform Job Task and/or Table-Top Analyses for Key Positions in Step 1 to Identify Skills and Knowledge Requirements

Job Task Analyses (JTAs) and/or Table-Top Analyses being conducted on the key positions in Step 1 will be completed according to the Y-12 Plant restart schedule (DNFSB Recommendation 94-4) and the DOE 93-3 implementation plan (DNFSB Recommendation

93-3). The Knowledge Preservation Program team is working closely with personnel responsible for obtaining these analyses to ensure that needs for both programs (including the Knowledge Preservation Program) are being addressed. The skills and knowledge identified in the JTAs and Table-Top Analyses can be used to develop lines of inquiry for interviews of key individuals. Likewise, anecdotal knowledge captured can be fed back into the JTAs and Table-Top Analyses to show enhanced skills and knowledge requirements where appropriate.

Step 3: Identify Key Functional Areas/Positions

Production Capability Assurance Program and Management Questionnaires

Because of the large number of personnel exiting the NWC as part of the downsizing initiative, the DOE-ORO Y-12 Site Office tasked the Y-12 Plant, in January 1994, to implement a formal Knowledge Preservation Program. A method for quickly identifying critical functional areas utilized the existing Production Capability Assurance Program (PCAP) documents to identify the high-level key processes. Both disassembly and assembly operations, as well as a number of other functional operations, were identified as key processes. Using organization charts, the major processing area managers were identified, then management questionnaires were issued to determine the most trouble-prone and critical processes and identify those personnel who possess key knowledge. Appendix B is a sample questionnaire for a process area manager.

Critical Safety Elements

The list of critical safety elements identified by DOE during the implementation of DNFSB Recommendation 93-1 will be reviewed for applicability to the Y-12 Plant Disassembly, QE, and Assembly organizations. Any critical safety element that is applicable and has not been identified through either process management questionnaires, TIM, or PCAP documentation will be added to the list of key functional positions.

Training Implementation Matrix

Critical functional positions identified in Step 1 will be correlated and, where there are applicable differences, added to the positions identified from the PCAP documentation, the process management questionnaires, and the critical safety elements. Differences noted between the TIM list and knowledge-capture list and the critical safety element list will be brought to the attention of the Y-12 Plant training organization. The newly identified positions will be added to generate the list to be used in Step 2 for JTAs and/or Table-Top Analyses. This consolidated list of functional areas and positions will be distributed to Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL) for comment.

Step 4: Identify Personnel with Critical Knowledge, Skills, and Abilities

To date, 175 people have been identified for the functional areas and positions defined through the process management questionnaires. Because this effort was not initially limited in scope, not all of the personnel on the list are associated with disassembly, QE, or assembly

operations. However, in January 1995, the immediate scope of this project was narrowed to focus on disassembly and associated safety support processes, QE processes, and assembly processes (related to weapon modifications). If specific personnel to be interviewed are unavailable, the knowledge-capture process will continue with the next priority, and the initial personnel will be interviewed later. As personnel are interviewed in Step 5, they will be asked for the names of others who may possess specialized (particularly safety-related) knowledge, about the process. Names not already identified will be added to the list. Identification of personnel who have worked on weapons systems scheduled for dismantlement is of particular importance. A list of key functional positions, current incumbent names, and former personnel who held those positions will be generated. Additionally, the list of personnel who are incumbent to the identified key positions will be reviewed for projected near-term loss to identify positions with skills and knowledge that are at risk. The Memorandum of Intent and Commitment to be developed by the Y-12 Plant for critical knowledge preservation will address the responsibility of line management to periodically evaluate key positions for risk from loss of personnel and to plan for action to transfer the knowledge/skills to new individuals for preservation.

The list will be expanded to include additional personnel identified as possessing critical skills and knowledge by the JTAs and Table-Top Analyses conducted in Step 2. These personnel include both current and recently retired employees. Because of organizational and position description changes, retirees may be interviewed who previously worked in the key functional areas but were in different organizations or positions. Department of Energy Notice 3131.1, *Access to Skills, Knowledge, and Abilities of Retired Scientists and Engineers for the Nuclear Weapons Program*, specifically authorizes the use of retired scientists and engineers to support the DOE nuclear weapons program. The Y-12 Knowledge Preservation Program will take advantage of this authorization to arrange interviews with key retirees. A list of identified retirees to be interviewed will be prepared and transmitted to ORO for concurrence in making these former employees available for knowledge capture based on DOE Notice 3131.1. When it is developed, the Y-12 Plant Memorandum of Intent and Commitment for knowledge preservation will provide the mechanism for retaining access to former employees under this program. A list of former employees who are considered to be a part of the Y-12 Plant retiree corps will be submitted to the DOE.

Step 5: Conduct Interviews to Capture Knowledge and Skills Not Already Documented

<u>Deciding Upon A Recording Medium</u>

Initial experience at the Y-12 Plant indicates that most of the knowledge—which is held by separate individuals located in small, well-defined areas—can be captured in short personal interviews. Accordingly, the typical recording medium will be a text file on a computer. As appropriate, either handwritten notes or an audio recording will be used to document the interview. When the interview is scheduled, the interviewee will be asked about the scope of his or her technical area. If the scope is limited to one process or operation, handwritten notes are practical, but if the scope involves multiple processes or area operations, an audio recording may be used. Handwritten notes and audio recordings will be transcribed into computer text files. Interviews for some processes, such as subassembly teardown, are or will be recorded on either film or videotape with audio commentary.

Conducting Interviews

Staff workers at SNL developed an effective videotaping method for interviewing weapons designers, testing engineers, and others who have broad technical knowledge. However, at the Y-12 Plant, much of the expertise tends to occur in small, well-defined domains, such as the details of how to machine a particular part or how to safely disassemble a certain canned subassembly.

The Y-12 Plant will use personal interviews, which are a simpler variation of the SNL method, to capture most of the production-related knowledge economically. In the case of experts with general technical expertise such as direct support process engineers, the SNL method of videotaping or another medium may be used. An interviewer will conduct a 1- to 2-hour personal interview with the subject matter expert. If a peer of the subject matter expert is available, he or she may be invited to attend the interview (as is done in the SNL videotaping method). For the process engineers and similar technical support people, a related technical subject expert from the Y-12 Plant Development Division, if available, will be invited to stimulate the conversation and act as an informal peer reviewer. If the subject matter expert has key knowledge in more than one domain (for example, several different key processes), a separate interview for each domain might be needed because of the focus and time involved.

The interview is pivotal to the success of the project. Good interpersonal techniques must be used, since we are dealing with skilled individuals who may feel threatened by downsizing. The approach will be to elicit information in a concerned, interactive, and conversational way. In all cases, the person being interviewed must be given the first opportunity to talk.

The interviewer will concentrate on the knowledge and experience beyond the existing documentation. Some examples of such knowledge are as follows:

- Unusual or difficult nuclear safety issues (including specific weapon systems);
- Unusual or difficult work with hazardous materials;
- Work requiring great skill, precaution, insight, or experience;
- Undocumented "rules of thumb";
- Exception handling not fully specified in procedures;
- Subjective areas not covered by procedures;
- Common mistakes (commissions and omissions);
- Significant earlier problems and solutions;
- Undocumented alternative solutions to a particular problem;

- Reasons for choosing current methods; and
- What records exist and the location.

A questionnaire (see examples in Appendixes B through D) will be used only as a loose guide to stimulate thinking. The subject will be encouraged to take the interview into areas that he or she thinks are important while the interviewer merely keeps the discussion within the general domain of interest.

Interviews have been conducted with 68 of the 175 people identified in Step 4. Since a number of these interviews occurred before the scope was narrowed, not all the people interviewed are associated with the disassembly, QE, assembly operations, or safety support organizations. Interviews from the list in Step 4 will continue. Priority will be given to those involved with disassembly, QE, or assembly operations (particularly those with knowledge of weapons systems scheduled for dismantlement), and those who will be retiring or have recently retired. These interviews will be conducted concurrently with Step 2.

Transcribing and Verifying Data

The interviewer will either use notes from a personal interview or transcribe from a voice tape, as applicable, to reconstruct the main content of the conversation. An American Standard Code for Information Interchange (ASCII) text file will be constructed for each interview. As a quality control measure, the subject matter expert will review, comment upon, correct, and supplement the information in the file.

Initial experience indicates that, for a production environment, the handwritten or transcribed notes for a typical interview, giving succinct and specific details, will occupy only 2 to 15 pages of text. Moreover, we estimate that fewer than 200 individuals will need to be interviewed, resulting in a manageable collection of knowledge text files and other materials.

Qualification of Interviews

All program personnel who will be conducting knowledge-preservation interviews will be instructed in the techniques and methods to ensure consistency of the knowledge-capture process.

Step 6: Administer Exit Questionnaire for Personnel Occupying Critical Positions

Personnel in key positions who are terminating employment at the Y-12 Plant will be asked to complete an exit questionnaire. The Human Resources case worker will have a checklist form that identifies the key positions (primarily operators, engineers/technical staff, supervisors, and direct technical and safety-related support for disassembly/assembly operations). A member of the Y-12 Plant training organization will administer the appropriate questionnaire. Most interviews will be done with voice recording at the appropriate classification level. Some individuals may be videotaped in a panel discussion format. Voice recordings will be transcribed and entered into the knowledge base.

Step 7: Archive the Knowledge Captured

A first option for long-term preservation of critical knowledge is to publish the text material, which is expected to be the bulk of all that is collected, in a few hard-copy reports arranged by key process technology areas, one copy of which would be kept in a central location. A second option is to store the information on optical disk or CD-ROM (Compact Disk-Read Only Memory). Although the latter option has a shorter useful life, it would provide easier access. Films and videotapes have two separate lifetimes. The knowledge-capture effort at the Y-12 Plant will be ongoing, and part of this effort will be to maintain the information. Conversion to improved storage media will be performed as needed.

The ASCII text format will be used for long-term preservation of the text files. This format will provide a data format most likely to be supported by the widest range of future computer technologies. (Current word processing formats and document-markup languages have a lifetime of only a few years.) The separate text files can be organized in subdirectories by subject in order that the interviews can be accessed or printed quickly and updated easily with a simple text editor.

The weapons laboratories indicated that they will use a Mosaic™ user interface with a Wide-Area Information Server (WAIS™), which are both free over the Internet, and Netscape™ text search modules. The Netscape™ software provides full-text search on any significant word instead of using a thesaurus that is limited to word indexing. The text files that will be produced at the Y-12 Plant are compatible with Netscape™, WAIS™, and Mosaic™. A Unix™ workstation with a Netscape™ interface will be set up in a secure area of the Y-12 Plant. Current Y-12 Plant computer security regulations may or may not allow NWC-wide network access.

A pilot project to electronically archive existing key programmatic, safety-related procedures and documents (including appropriate facility safety documentation) by weapon system is scheduled to be initiated in FY 1996 as a project under the Defense Programs Advanced Design and Production Technology (ADaPT) program. An initial effort under this project will be to develop a generic secondary assembly safety specification (which bounds the range of secondary design) for dismantlement and/or modification that will identify sources of existing safety- and hazards-related documentation. Any subject areas that are deficient of source documents will be identified and resources will be allocated to develop the knowledge and capture the required information. As indicated, these documents comprise up to 90 percent of the Y-12 Plant safety-related process knowledge, and ready access to a set that is centrally managed and configuration controlled can be a valuable tool for safe operations (including development of dismantlement procedures). After the initial effort concerning the secondary assembly safety specifications, the demonstration project will concentrate on the W87 Life Extension Program and as such will provide a valuable test case. Follow-on work will involve the other enduring stockpile weapon systems.

Step 8: Determine the Best Future Use of the Knowledge

After the knowledge has been captured, a decision will be made, in coordination with the users, as to whether to incorporate the information into standards or transfer it to

personnel currently in those positions. If the captured knowledge is to be transferred to personnel, decisions on how best to accomplish the transfer will be coordinated with the responsible operating, safety, and training organizations. Steps 9 through 11 are options for transferring the knowledge captured in the preceding steps. Current anecdotal knowledge recorded to date has not captured any new safety-related knowledge that was not already documented. However, historical information that documents near-misses (per DOE Order 5000.3c) or explains the reasons work was done as it was has been identified for future use.

Step 9: Input the Captured Knowledge into Current Procedures

Information, particularly safety-related information, captured in interviews will be used, when needed, to update current procedures. A determination of what information should be included and how best to incorporate it into procedures will be made in coordination with the responsible operating and safety organizations. For example, part or all of the information captured on a weapon system scheduled for dismantlement could be incorporated into the dismantlement procedure for that system.

Step 10: Develop Required Reading or Training Modules

Where applicable, information gathered during interviews will be incorporated into the Required Reading Program, or, where warranted, new or revised training modules will be developed. A determination of what information should be included and how best to convey it to the users will be made in coordination with the responsible operating and training organizations.

Step 11: Develop Expert Systems and/or Automatic Data Retrieval Systems

When appropriate, the information from the interviews may be used to develop specific expert systems and/or automatic data retrieval systems. An automatic data retrieval system could include electronic systems that incorporate part or all of the process and safety knowledge now on paper or film to electronic media. This step, which will require considerable funding and personnel resources, will be worked as resources allow. The weapon returns dismantlement process will be the first area considered for an automatic data retrieval system. The current plan is to conduct much of this work under the ADaPT initiative. One of the program areas, *Knowledge Preservation and Access*, in ADaPT has goals that are consistent with Recommendation 93-6.

B. OAK RIDGE OPERATIONS

Step 12: Identify Key Functional Positions and Perform Job Task Analyses and Interviews of DOE-ORO and Y-12 Site Office Staff

The Y-12 Site Office, in coordination with the DOE-ORO Training and Development Division, developed a statement of work for the Oak Ridge Institute for Science and Education (ORISE) to perform knowledge capture of key positions in ORO and the Y-12 Site Office. The task includes identification of key oversight positions (particularly as they relate to safety) of the Y-12 Plant, review of position standards and JTAs that exist (or are being performed under

DNFSB Recommendation 93-3) to identify skills and knowledge requirements useful for interview lines of inquiry, identification of personnel (both current and former) for interview, and preservation of the captured information into text. The list of positions related to safety is based upon a review of the Critical Safety Elements of Recommendation 93-1 and the requirements of DOE Order 5480.20, *Personnel Selection, Qualification, Training, and Staffing*. A matrix list of critical functional areas, positions related to safety, and personnel (current and former) will be prepared. Personnel will be interviewed to capture anecdotal knowledge they may have concerning the oversight of operational safety and safety support specialties. The knowledge captured will be recorded and transcribed into text files that can be indexed. Access to former personnel will be retained in accordance with DOE Notice 3131.1. The evaluation of loss of key personnel and replacement with skilled and knowledgeable staff is an ongoing responsibility of line and support staff management.

Step 13: Assess/Develop/Revise Required Reading, Training Modules, and Procedures as Needed

Once the knowledge is captured from the interviews, an assessment will be made in coordination with the responsible functional managers/users as to what portion of the information adds value and how the information will be used. Additionally, the knowledge captured by the Y-12 Plant will be reviewed to identify information that will be useful in the federal knowledge-capture project. Procedures, Required Reading, and/or training modules may be developed or revised to incorporate the captured information and then added to the training and qualification requirements for the position.

Step 14: Perform an Assessment of Program Implementation to Monitor Goals/Requirements

Periodically, the Y-12 Plant and the Y-12 Site Office will assess the implementation of the program plan. A self-assessment of the DOE-ORO and Y-12 Site Office knowledge-capture activities and an oversight assessment of the Y-12 Plant knowledge-capture efforts will be included in the DOE Y-12 Site Office assessment. The review criteria will be focused on the level of performance of each step of the program plan. The frequency of assessment will depend on the severity of the findings generated by the baseline program assessment. Findings from this step will be used in Step 15.

Step 15: Generate a Report with Findings and Action Items

Findings and observations will be generated for action with issues tracked to closure through the normal processes in use at Oak Ridge. Results of the assessments will be included in the annual status reports to be issued.

IV. CONCLUSION

The Knowledge Preservation Program is an ongoing, iterative process that will continue as a program at the Y-12 Plant. Activities performed each year will depend on continuing mission assignment, level of need, and funding resources. The rest of FY 1995 will be used to continue interviewing personnel currently identified. Also, activities with disassembly personnel will continue to integrate needs for the JTAs described in Step 2. Later, a Y-12 Plant Memorandum of Intent and Commitment will be issued both to support these efforts through FY 1996 and FY 1997 and to ensure the institutionalization of this process for the identified key positions. The subrecommendations (see *Introduction, subrecommendation 1-5*, on page 7 of this document) from DNFSB Recommendation 93-6 have been addressed as follows:

1. Subrecommendation 1 is addressed by program plan Steps 1, 2, 3, 4. and 12.

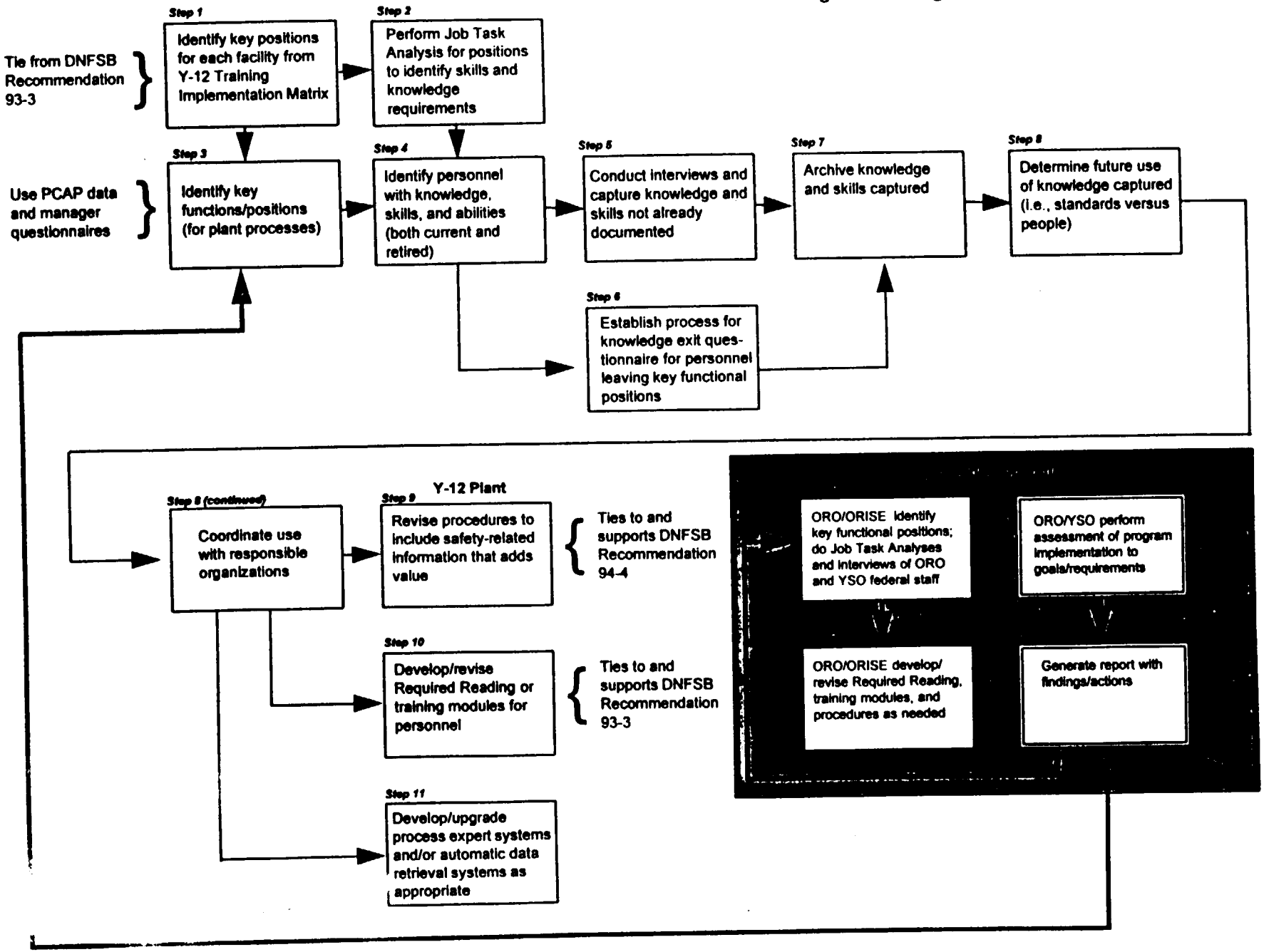
2. Subrecommendation 2 is addressed by Steps 4 and 12.

3. Subrecommendation 3 is addressed by Steps 4 and 12.

4. Subrecommendation 4 is addressed by Steps 5, 6, 7, and 12.

5. Subrecommendation 5 is addressed by Steps 5, 7, 8, 9, 10, 11, 13, and by the Y-12 Plant Age Degradation Study and the Canned Secondary Assembly Storage Standard.

APPENDIX A
Process Flow Diagram of the Oak Ridge Knowledge Preservation Program



APPENDIX B

Questionnaire for an Area Manager

What is your educational and experience background? What qualifications or personal qualities do you feel are important to your position?

What does your area do?

What are the input materials, and what is the product?

Name any processes that involve unusual or demanding nuclear safety issues.

Name any processes that involve unusual or demanding safety considerations.

What are your most hazardous processes with regard to toxic/hazardous materials?

Describe any near-misses that your area has had in nuclear safety or health and safety categories. How were they handled?

Name the three or four most important, from a plant standpoint, processes in your area.

Name the three or four most difficult processes in your area.

Name your three or four most knowledgeable/experienced workers.

Does your area have any jobs that require great skill, precaution, insight, or experience?

Are there any individuals that you cannot do without?

If you had to start up a new program, who would do the planning and/or provide key input?

Think of the most difficult process in your area. Why is it difficult? (anything—materials, scheduling, people skills, etc.)

Name the most breakdown-prone process in your area.

Tell me a war story. What was the most difficult weapons part that you had to do in this area?

Are there any approaches that you would have liked to take if there were no restraints? Were there any ideas that you had (have) that you feel strongly about but which were not accepted?

Go down the list of the processes in this area, and tell me who does the planning for each process.

Name some significant previous problems or challenges handled by your work area.

List the major weapons programs that you have worked on.

Are there any undocumented problems that you know of with a specific weapon that will cause difficulty at dismantlement time?

Are there certain actions that your area has to take to get ready for a dismantlement campaign?

What are the most difficult aspects (things to watch for) in dismantlement in general or in specific weapons?

APPENDIX C

Questionnaire for a Process Operations Expert

What is your educational and experience background? What qualifications do you feel are important to your position?

What is the name of your current process?

What does your process do?

What are the input materials, and what is the product?

Does your process involve unusual or demanding nuclear safety issues? Describe.

Does your process involve unusual or demanding safety considerations? Describe.

Does your process involve toxic/hazardous materials? Describe.

Describe any near-misses that your process (including other workers) has had in nuclear safety or health and safety categories. How were they handled?

Tell me a war story. Pick one where, at first, people didn't know how to handle the problems.

What sorts of routine problems do you encounter?

What is the fix for them?

What is the most difficult problem that you have worked on?

How did you solve the problem?

Are there written procedures for the recent jobs/parts/projects that you have worked? Where are they stored/maintained?

Who are some of the other people working in your area of specialty? (Include retired people.)

Pick a difficult part/project that you have worked on. Walk me through the procedure.

Are there areas where you have to use judgment in ways not mentioned in the procedure?

Have you learned any unusual techniques for handling parts of your job? Describe.

Are there any approaches that you would have liked to take if there were no restraints

Were there any ideas that you had (have) that you feel strongly about but which were not accepted?

What sorts of mistakes, forgetfulness, or poor practices do you see people commonly doing?

When you retire, if you were asked to train your replacement, what kinds of warnings and job tips would you give him/her?

List the major weapons programs that you have worked on.

Are there any undocumented problems that you know of with a specific weapon that will cause difficulty at dismantlement time?

Are there certain actions that your area has to take to get ready for a dismantlement campaign?

What are the most difficult aspects (things to watch for) in dismantlement in general or in specific weapons?

APPENDIX D

Questionnaire for a Technical Subject Expert

What educational degrees and other training do you have?

Give a brief synopsis of your job assignments since hiring on. What qualifications do you believe are important for this position?

Name some other individuals who have worked in your specialty. What special skills and personality traits does it take to work successfully in your subject area?

Do you have technical reports that you or others have done in this area? Where are they stored/maintained?

Have you had to solve problems involving nuclear safety issues? Describe.

Have you had to solve problems involving toxic or hazardous materials? Describe.

Name some jobs that required your greatest skill, insight, and experience. (Note to interviewer: explore each job.)

Pick one of your tougher jobs and tell how you solved it and why you chose the approach that you used.

Have you handled work that is outside classical, "school" methods, that you had to devise some unusual, one-of-a-kind approach? Describe.

Are there any rules of thumb that you have used in your work? Explain.

Have you ever had people say or imply that you wouldn't be able to solve a problem, but then you actually did? Describe.

Are there any approaches that you would have liked to take if there were no constraints (funds, time, staffing, etc.)? Explain.

Have you had any ideas that were not accepted, that you felt strongly could be beneficial? Explain.

Name some typical mistakes, omissions, commissions, or assumptions that you see others commonly making in your subject area.

Have you learned any unusual techniques for handling parts of your job? Describe.

When you retire, if you were asked to train your replacement, what kinds of warnings and job tips would you give him/her?

List the major weapons programs that you have worked on.

Are there any undocumented problems that you know of with a specific weapon that will cause difficulty at dismantlement time?

Are there certain actions that your area has to take to get ready for a dismantlement campaign?

What are the most difficult aspects (things to watch for) in dismantlement in general or in specific weapons?

Do you know of any undocumented solutions to a particular problem on a particular weapon system?

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Testing Operations

1. Responsibility

The Manager, Nevada Operations Office, is responsible for the implementation of this task, subject to approval from the Deputy Assistant Secretary for Research and Development. Relevant Nevada management and operating contractor(s) and the nuclear weapons laboratories will provide assistance as required.

2. Commitment C.1

The Nevada Operations Office will revise NV 56XE.1, Underground Nuclear Testing, to include: (1) an annual qualitative assessment of the critical functional areas, key positions, Job and Task Analyses (JTAs), and personnel of each organization involved in nuclear testing activities to determine whether the descriptions are current and sufficient to meet the Nevada Operations Office mission and to determine if additional, technically competent personnel are required; this assessment will consider information captured in the archiving program and learned from the test exercise program; (2) the development of an annual exercise/activity plan to ensure that key positions, facilities, management systems, and controls are exercised; and (3) an annual completion report of accomplishments in developing and maintaining personnel in key positions and of lessons learned for each exercise or experiment.

3. Deliverable

Revised NV 56XE.1, Underground Nuclear Testing

U.S. DEPARTMENT OF ENERGY

NEVADA OPERATIONS OFFICE

ORDER

NV 56XE.1A

12-29-95

Subject: UNDERGROUND NUCLEAR TESTING

1. PURPOSE. Provide policy and direction and establish authorities and responsibilities for the U.S. Department of Energy (DOE) underground nuclear testing program conducted at the Nevada Test Site (NTS). During the testing moratorium, appropriate sections of this Order will be exercised consistent with the test readiness program.

2. CANCELLATION. NV Order 56XE.1, UNDERGROUND NUCLEAR TESTING, of 10-26-93.

3. SCOPE. The provisions of this Order apply to all organizational elements of the DOE Nevada Operations Office (DOE/NV), DOE/NV contractors and subcontractors, associated agencies, and NTS users.

4. EXEMPTIONS. None.

5. REFERENCES. Refer to Chapter VI.

6. DEFINITIONS. Refer to Chapter VII.

7. POLICY. Underground nuclear testing operations will be carried out under the authority of the Atomic Energy Act of 1954, as amended; DOE Reorganization Act, Public Law 95-91, of 8-4-77; the Energy Reorganization Act of 1974; the Limited Test Ban Treaty, the Threshold Test Ban Treaty, the Peaceful Nuclear Explosions Treaty, and other international agreements; Nevada Test Site Environmental Impact Statement of 1977; and additional guidance as provided by the Assistant Secretary for Defense Programs (DP-1). These operations will be conducted subject to programmatic and detonation approvals provided by the Deputy Assistant Secretary for Research and Development (DP-20), DOE Headquarters (DOE/HQ).

INITIATED BY:
Operations Management Division

8. OBJECTIVES.

a. Tests are conducted in a manner that protects the health and safety of on-site workers and the general public.

b. Tests are conducted in a manner that precludes an unauthorized, accidental, or inadvertent detonation of a nuclear explosive.

c. Tests are conducted in compliance with all applicable environmental laws and regulations.

d. All necessary emergency preparedness resources are available prior to the detonation of a nuclear explosive.

e. Operations are conducted within available funding provided by DOE and other Federal agencies.

f. Tests are conducted in accordance with provisions of the Limited Test Ban Treaty, the Threshold Test Ban Treaty, the Peaceful Nuclear Explosions Treaty, and all other applicable treaties and international agreements.

g. Tests and test series are formally documented for dissemination and for the historical record.

h. The NTS users obtain scientific data.

9. RESPONSIBILITIES AND AUTHORITIES.

a. DOE/NV Manager is responsible for the safe conduct of the underground nuclear testing program. The DOE/NV Manager:

(1) Charters and appoints members to the following panels in accordance with NV Order 11XB.1:

(a) Containment Evaluation Panel.

(b) Threshold Treaty Review Panel.

(c) Verification Evaluation Panel.

(d) Any other review panel or special study group deemed appropriate.

(2) Appoints the DOE Test Controllers and provides guidance and direction to them.

(3) Approves the individuals nominated to serve as members of the Test Controller's Scientific Advisory Panel or laboratory Test Directors.

(4) Appoints the DOE/NV Chairperson for the Nuclear Explosive Safety Study or Survey for the nuclear test, and requires certification of members appointed by other Operations Office Managers to serve on the DOE/NV study or survey group.

(5) Certifies all DOE/NV Personnel Assurance Program participants, and accepts certification by other Operations Office Managers.

(6) Presides, or assigns a senior staff member to preside, over the Test Management Information Center during test execution.

(7) Reviews and forwards Nuclear Explosive Safety Studies for approval to DP-20.

(8) Approves the Nuclear Explosive Safety Studies Survey and Nuclear Explosive Assembly As-Built Reviews.

(9) Certifies to DP-20 that assembled nuclear explosives are in conformance with the approved Nuclear Explosive Safety Studies.

(10) Requests detonation authority from DP-20.

(11) Approves the public information release policy related to each nuclear test.

(12) Serves as Lead Federal Agency Official in the event of a major radiological release.

(13) Delegates authorities and operational responsibilities to the Directors of the Los Alamos National Laboratory (LANL) and the Lawrence Livermore National Laboratory (LLNL) and Test Directors, as necessary, to conduct the underground nuclear test program.

b. Assistant Manager for Administration.

(1) Provides contract administration for all contracts and interagency agreements relative to essential support services required for the testing program such as geology, meteorology, and radiological safety.

(2) Gathers, reviews, and analyzes data from participating organizations, as necessary, to prepare an annual report for historical documentation of testing at the NTS.

c. Assistant Manager for Environment, Safety, Security, and Health.

(1) Ensures all necessary environment, safety, health protection, and security activities are carried out.

(2) Assigns the Health Physics Advisor to the Test Controller's Scientific Advisory Panel.

(3) Reviews and submits the Intruder Interdiction Action Plan to the Assistant Manager for Operations.

d. Assistant Manager for Operations.

(1) Ensures that all necessary construction, logistical, technical, nuclear explosive safety, operational, emergency response, and nuclear testing treaty activities are carried out.

(2) Provides the Manager with scientific and management advice and assistance in the development and execution of policies, programs, and projects in support of nuclear testing.

(3) Approves the DOE/NV Master Test Schedule.

(4) Approves the Intruder Interdiction Action Plan.

(5) Authorizes the receipt, assembly, disassembly, and storage of nuclear explosives on the NTS.

(6) Identifies key positions critical to the safe preparation and conduct of nuclear testing.

e. Director, Public Affairs Office (PAO). Provides Public Affairs Specialists to the Nuclear Test Organization and the Test Management Information Center.

f. Director, Information Management Division. Prepares the annual DOE/NV Test Series Completion Report.

g. Director, Safeguards and Security Division.

(1) Assigns a Security Advisor to the Nuclear Test Organization.

(2) Administers the Nuclear Materials Management Program.

(3) Oversees intruder interdiction activities.

h. Director, Safety Division. Provides a Safety and Occupational Safety Advisor to the Nuclear Test Organization.

i. Director, Health Protection Division.

(1) Provides a Radiological Operations Officer to the Nuclear Test Organization.

(2) Provides a Radiological Safety Advisor to the Test Management Information Center.

j. Director, Environmental Protection Division. Reviews each nuclear test for conformance with applicable environmental laws and regulations.

k. Director, OMD.

(1) Directs the Operations Coordination Center in support of nuclear testing.

(2) Provides a Test Management Information Center Manager during test execution periods.

(3) Provides a Test Operations Officer, Test Liaison Officer, Test Scientific Officer, and Air Operations Officer to the Nuclear Test Organization.

(4) Prepares a Detonation Authority Request package for each nuclear test and submits it to the DOE/NV Manager for further submission to DP-20.

(5) Prepares authorization to move, emplace, and stem, and submits it to the Test Controller.

(6) Provides administrative, technical, and clerical support to the Containment Evaluation Panel. Ensures conclusions and recommendations of the Containment Evaluation Panel are recorded and included in the Detonation Authority Request package.

(7) Provides technical guidance and direction under the Interagency Agreement with the U.S. Geological Survey (USGS) to ensure that the geological and hydrological information pertinent to containment is made available to appropriate DOE organizations, laboratories, and the Containment Evaluation Panel.

(8) Provides technical guidance and direction under the Interagency Agreement with National Oceanic and Atmospheric Administration (NOAA), Air Resources Laboratory (ARL) Special Operations and Research Division (SORD), to ensure proper meteorological support to the Nuclear Test Organization.

(9) Administers the Interagency Agreement with the U.S. Environmental Protection Agency (EPA)/Office of Radiation and Indoor Air (ORIA)-Las Vegas in support of an independent EPA/ORIA radiological surveillance and safety program in off-site areas.

(10) Administers the Interagency Agreement with the U.S. Department of Interior, Bureau of Mines, to provide surveillance of mining activities in surrounding areas.

(11) Prepares the DOE/NV Master Test Schedule and submits to the Assistant Manager for Operations.

(12) Maintains the official record copy of all event files.

(13) Administers the Containment Evaluation Panel member consultant agreements.

(14) Administers the Scientific Advisory Panel medical doctor consultant agreements.

(15) Annually tasks the Nuclear Test Organization to review:

(a) The critical activities of the functional areas to determine whether descriptions are current and sufficient to meet the DOE/NV mission.

(b) Job and task analysis to ensure relevancy to the current critical functional areas.

(c) Their key positions for adequate coverage of the critical functional areas and provide a plan of action to correct shortcomings.

l. Director, Nevada Test Site Office (NTSO).

(1) Provides an NTSO representative to the Nuclear Test Organization.

(2) Ensures that the Mercury Control Center is operational and available to support the Nuclear Test Organization, and provides an NTSO representative to the Mercury Control Center.

(3) Provides logistical and construction support for test program preparation, execution, and post test activities.

m. Director, Emergency Management and Nonproliferation Division (EMND), for tests being monitored under Treaty rights.

(1) Provides a Verification Representative and a Verification Liaison Officer to the Nuclear Test Organization.

(2) Ensures all DOE/NV Threshold Test Ban Treaty Protocol responsibilities are satisfied.

(3) Provides support to the On-Site Inspection Agency.

(4) Coordinates the working and living facilities and verification equipment for the On-Site Inspection Agency and the designated personnel.

(5) Provides an Emergency Readiness Assurance Specialist and Federal Radiological Monitoring and Assessment Center representative to the Nuclear Test Organization during all testing events.

(6) Provides a Test Emergency Management Officer to the Test Management Information Center.

(7) Ensures that the DOE/NV Emergency Operations Center is operational and available to the Test Management Center personnel during all testing events.

n. Director, Nuclear Explosive Safety Division.

(1) Provides a Nuclear Explosive Safety Advisor to the Nuclear Test Organization.

(2) Ensures that a proposed nuclear test will be conducted in compliance with DOE and NV Orders 5610.10 and 5610.11A, and that DP-20 approval is obtained prior to beginning any nuclear explosive operation.

(3) Prepares the nuclear explosive safety documentation portion of the Detonation Authority Request package.

(4) Provides field reviews of each nuclear test event to ensure the application of nuclear explosive safety rules and study recommendations.

o. Directors, LANL or LLNL.

(1) Direct the field and technical aspects of experiments and tests.

(2) Provide the nuclear explosives for each nuclear test.

(3) Provide a Test Director for each nuclear test.

(4) Provide a Scientific Advisor to the Nuclear Test Organization to serve as Chairman of the Test Controller's Scientific Advisory Panel.

(5) Provide a member to the Threshold Treaty Review Panel.

(6) Fulfill responsibilities and authorities as delegated by the DOE/NV Manager, and as necessary to accomplish the mission set forth in NTS Standard Operating Procedure (NTS-SOP) 1104.

p. Director, EPA/ORIA-Las Vegas.

(1) Provides an independent radiological surveillance and safety program in the off-site areas.

(2) Provides the Off-Site Radiological Safety Advisor member to the Test Controller's Scientific Advisory Panel.

(3) Provides an Off-Site Radiological Safety Project Officer to the Nuclear Test Organization.

q. Meteorologist in Charge, National Oceanic and Atmospheric Administration, ARL/SORD.

(1) Directs meteorological support to the nuclear test program.

(2) Serves as the Meteorological Advisor member of the Test Controller's Scientific Advisory Panel.

(3) Provides an ARL/SORD Weather Event Support Meteorologist and Event Radiation Fall-out Support Specialist to brief and support the Nuclear Test Organization.

r. Program Coordinator, NTS Weapons Program, USGS. Ensures an independent review of the event site geology and hydrology, and the containment prospectus for each nuclear test.

s. U.S. Air Force/DOE Liaison Office. Provides a Liaison Officer to the Nuclear Test Organization.

t. Test Controller.

(1) Ensures the safe conduct of each test in compliance with the DOE/NV Manager's Delegation of Authority memorandum, DOE and DOE/NV Directives, Orders, Notices, instructions, written policy and guidance, containment plans, and the treaties.

(2) Has operational control of the NTS during the test execution period and has the authority to proceed with, delay, or postpone tests as may be necessary.

u. Nuclear Test Organization. Is an organization formed for the purpose of conducting nuclear tests. The composition of the Nuclear Test Organization may be readily adjusted or changed in response to the needs and technical objectives of the DOE nuclear test program.

The Nuclear Test Organization is comprised of the following positions with responsibilities and authorities set forth in NTS-SOP 1102.

(1) Test Controller.

(2) Test Director.

(3) Test Controller's Scientific Advisory Panel.

(a) Chairman, Scientific Advisor.

(b) U.S. Environmental Protection Agency Off-Site Radiological Safety Officer.

(c) NOAA ARL/SORD Meteorological Advisor.

(d) Medical Advisor.

(e) Health Physics Advisor.

(4) NOAA ARL/SORD Weather Event Support Meteorologist.

(5) NOAA ARL/SORD Event Radiation Fallout Support Specialist.

(6) U.S. EPA Off-Site Radiological Safety Program Officer.

(7) Air Force Liaison Officer.

(8) Radiological Operations Officer.

(9) NTSO Representative.

(10) Security Advisor.

(11) Nuclear Explosive Safety Advisor.

(12) Emergency Readiness Assurance Specialist.

(13) Federal Radiological Monitoring and Assessment Center Representative.

(14) Test Operations Officer.

(15) Test Liaison Officer.

(16) Test Scientific Officer.

(17) Air Operations Officer.

(18) Public Affairs Specialist.

(19) Laboratory Containment Scientists.

(20) Verification Liaison Officer.

(21) Verification Representative.

(22) Safety and Occupational Safety Advisor.

(23) Other contractor and laboratory support personnel as required.

v. Test Management Information Center.

(1) Supports the DOE/NV Manager during test execution periods.

(2) Is converted to the Lead Federal Agency Emergency Operations Center, if necessary.

(3) Encompasses the following positions with responsibilities and authorities set forth in NTS-SOP 1106:

(a) Manager or representative.

(b) Test Management Information Center Manager.

(c) PAO representative.

(d) EMND Test Emergency Management Officer.

(e) Radiological Safety Advisor.

w. Mercury Control Center.

(1) Provides for the emergency evacuation of the Mercury Base Camp and other uncontrolled areas of the NTS during nuclear test activities, if required.

(2) Is comprised of the following positions with responsibilities and authorities set forth in NTS-SOP 5501:

(a) NTSO Representative.

(b) Fire Department representative.

(c) NTS Bus Contract Administrator.

(d) Management and Operating Contractor representative.

(e) Security Contractor representative.

(f) Nye County Sheriff.

10. REQUIREMENTS. Refer to Chapters I through IV.

11. PROCEDURES. Each organization participating in the preparation, execution, or post test activities of a nuclear test shall have plans and procedures necessary to ensure compliance with applicable DOE and NV Orders, Directives, and NTS-SOPs.

Joseph N. Fiori

for Terry A. Vaeth
Acting Manager

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CHAPTER I

GENERAL REQUIREMENTS

1. DOE/NV MANAGER. As directed by DP-20 will:

   a. Develop and publish such directives, as necessary, to implement this policy.

   b. Provide for the submission of reports on a fiscal year basis to DP-20 for all operational matters pertaining to underground nuclear tests at the NTS.

   c. Provide written notification to DP-20 that the requirements of DOE and NV Orders 5610.10 and 5610.11A have been completed. This notification must be prior to any nuclear explosive operations commencing on a particular underground nuclear test, and may be part of the DOE/NV response to a Nuclear Explosive Safety Survey Group report.

   d. Secure programmatic and detonation authority from DP-20 prior to the detonation of any underground nuclear weapons test.

   e. Receive the required components and nuclear explosives and provide for their positive security, adequate storage, and necessary handling facilities at the NTS. The assembly of special nuclear materials and high explosives into a configuration capable of producing a nuclear detonation has been authorized to be performed only within the Pantex weapons production facility and the NTS. Assembly operations at any geographical location other than those authorized above must have approval of DP-20 prior to commencement.

   f. Ensure that every precaution has been taken to reduce to the lowest level technically and economically practicable all hazards, both to the public and on-site personnel, from any nuclear test detonation, subsequent post-shot operations, or other NTS operations.

   g. Ensure that all operations involving the risk of radiation exposure will be planned and executed in accordance with DOE Order 5480.11. Conservative area controls shall be instituted, and the use of forward area personnel and facilities restricted to the minimum essential with evacuation plans established for all remaining personnel.

   h. Ensure that the containment design, emplacement, and firing of the test device plus post-shot operations shall be conducted so that the probability of the release of radioactivity in sufficient quantity to

be a health hazard either on- or off-site is minimized. However, since accidents are always a possibility, the radiation guidelines approved by DOE for planning nuclear test detonations are predicated on the postulation that a release could occur and, therefore, require predictions to be made for the maximum potential exposure from each test using the most appropriate hypothetical release model. Thus, the "as low as reasonably achievable" concept for operations involving potential radiation exposure is governing; but, as a safety precaution, an accident model is postulated as a limiting factor. Therefore, in addition to the radiological criteria given above, the following shall also be adopted:

(1) For tests at the NTS, when considering the event day weather conditions and the specific event characteristics, calculations should be made using the most appropriate hypothetical release models which estimate the off-site exposures that could result from the most probable release scenario. Should such estimates indicate that off-site populations, in areas where remedial actions to reduce whole-body exposures are not feasible, could receive average whole-body dose exposures in excess of 0.170 R/year, the event shall be postponed until more favorable conditions prevail. In addition, events may only proceed where remedial actions against uptake of radionuclides in the food chain are practicable and/or indications are that average thyroid doses to the population will not exceed 0.5 rad/year.

(2) In those areas where trained radiation-safety monitors are available, where communications are effective, where people can be expected to comply with recommended actions, and where remedial actions against uptake of radionuclides in the food chain are practicable, events may proceed where indications are that individuals in those areas would not receive whole-body exposure and thyroid doses in excess of 0.5 R/year and 1.5 R/year, respectively.

(3) Should there be any release of radioactive material which may move off site, aircraft and ground radiation monitoring systems will be employed, along with detailed meteorological data, to predict radioactive cloud trajectories and potential exposure rates at downwind locations. Based upon these predictions and subsequent radiological monitoring observations, every effort will be made to keep total dose commitments from both internal and external emitters to the lowest practicable levels. To this end, remedial actions will be employed which are compatible with the provisions of the Clean Air Act and the reportable quantities of radionuclide release under the Comprehensive Environmental Response, Compensation and Liability Act (Title 40 Code of Federal Regulations, Part 30), a coordinated emergency action plan, and the basic philosophy

of the Environmental Protection Agency Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.

i. Assume responsibility for the proper containment of tests in accordance with the U.S. obligations under the Limited Test Ban Treaty. Nuclear weapons development tests and experiments are to be planned and executed so that the tests will not place measurable amounts of radioactive debris beyond the boundaries of the U.S.

j. Assume responsibility along with associated national laboratories for the implementation of the technical provisions of the Threshold Test Ban Treaty Protocol at the NTS in accordance with U.S. obligations under the Threshold Test Ban Treaty. Coordinate NTS testing operations and verification activities with DOE/HQ, On-Site Inspection Agency, laboratories, contractors, and associated agencies. This coordination includes evaluation and validation of the test operation plans and designs to ensure that all provisions of the Threshold Test Ban Treaty Protocol have been properly applied to each specific test.

k. Continue to maintain procedures for a panel of scientists (such as the Containment Evaluation Panel) to evaluate and advise on the technical adequacy of the containment design of each proposed nuclear test. This panel shall be composed of experts in the science of containment of underground explosions and the related disciplines. The panel shall have representatives from the weapons laboratories and the Defense Nuclear Agency as well as outside consultants. Adequate information on site geology, material properties, drilling history, hydrology, geophysics, and stratigraphy will be generated and presented for review by all members and all recommendations and evaluations properly documented. Data, recommendations, and evaluations on tests prepared for execution at the NTS will, after review by the sponsoring laboratory, this panel, and the DOE/NV Manager, be forwarded to DP-20 with a request for detonation authority at least 3 weeks prior to the date of needed authority.

l. Prior to the execution of each test, designate a Test Controller to ensure that either all test preparations have substantially followed the containment design or that significant deviations have been referred to the Containment Evaluation Panel and judged inconsequential to containment. The designated Test Controller shall be supported in his role by a panel of appropriate scientific disciplines to aid him in making such judgments. The sponsoring laboratory shall designate an individual responsible for providing pertaining information on activities affecting containment which have been completed since the last meeting of the Containment Evaluation Panel.

m. Ensure that no devices are tested at the NTS which have design yields in excess of 150 kilotons. A Threshold Treaty Review Panel shall be established and maintained to review and report on the design laboratory's preshot yield calculations for all tests with a design yield of 125 kilotons or greater. The panel's report on such tests shall be forwarded with the request for detonation authority to be in the office of DP-20 at least 45 days before the test readiness date. In order to make it practical to reconsider scheduled tests and to abide by the constraint that no more than two unintentional breaches occur within any 12-month intervals, no other test with a design yield of 125 kilotons or greater will be placed in an irreversible position prior to the sponsoring laboratory's prompt yield measurement determination that the last device tested with a design yield of 125 kilotons or greater did not have a device yield exceeding 150 kilotons. Should there be an apparent device yield greater than 150 kilotons, then no device with a design yield of 125 kilotons or greater will be placed in an irreversible position pending DOE reconsideration. Postshot Threshold Treaty Review Panel analyses should be provided to DP-20 as soon as possible in order to shorten the period of reconsideration.

n. As defined in DOE Order 5484.1, establish, as required in the event of an unanticipated substantial release of radioactivity or other unusual circumstances, a fact-finding board to conduct the investigations necessary to determine the cause, submit recommendations for prevention of similar occurrences, and prepare situation reports. DP-20 will be kept informed as to the nature of any accidental release of radioactivity.

o. Furnish DP-20 a yearly summary of all types of releases of radioactivity from any operations at the NTS.

p. Maintain, through the PAO, a Public Information Plan to conform with current DOE/NV public announcement policy as approved by DP-20.

q. Furnish DP-20 with a current test schedule, developed in coordination with the weapons laboratory directors and the Defense Nuclear Agency, as appropriate.

r. Prepare appropriate materials for environmental impact statements or assessments, required by the provisions of DOE procedures for compliance with the National Environmental Policy Act, to cover any proposed nuclear test operations and submit to DP-20 for review and processing.

2. PLANS AND PROCEDURES. Each organization participating in the preparation, execution, or post test activities of a nuclear test shall have plans and procedures necessary to ensure compliance with applicable DOE and NV Orders, Directives, and NTS-SOPs.

3. MASTER TEST SCHEDULE. The Master Test Schedule is a classified program planning document. The Master Test Schedule shall list the event name, sponsoring laboratory, site location, Test Controller and test operations officer, containment review status, and pertinent dates such as insertion, stemming, and test readiness. Participating organizations shall provide information on a timely basis as requested by the Director, OMD. Distribution shall be as directed by the Assistant Manager for Operations.

4. NUCLEAR EXPLOSIVE SAFETY. No nuclear explosive operation may commence until approval of a Nuclear Explosive Safety Study/Survey in accordance with DOE and NV Orders 5610.10 and 5610.11A.

5. TREATY VERIFICATION. For tests subject to monitoring under terms of the Threshold Test Ban Treaty:

   a. Preparation for and execution of the test will comply with terms of the DOE/NV "Operations Plan for Conduct of Verification Activities at the Nevada Test Site" Coordinated Schedule as negotiated for that specific event.

   b. The Director, EMND, will provide the On-Site Inspection Agency designated personnel with:

      (1) Required messages and notifications.

      (2) Satellite hole and geophysical data.

      (3) Required logistical support.

      (4) Training on the NTS safety requirements and emergency procedures.

6. ENVIRONMENT, SAFETY, AND HEALTH COORDINATION RESPONSIBILITY. All work locations at the NTS have an individual designated to coordinate the environment, safety, and health requirements that are applicable to all organizations participating at that location. Unless otherwise delegated, this responsibility is normally assigned to the NTS management and operating contractor. For nuclear test event sites, this responsibility is transferred to the sponsoring laboratory in accordance with NTS-SOP 6405.

CHAPTER II

TESTING REQUIREMENTS

1. SITE SELECTION. Location for proposed nuclear tests on the NTS will be selected and approved in accordance with NTS-SOPs 5417 and 6405.

2. SITE CHARACTERIZATION. Locations selected for proposed nuclear tests will be characterized in accordance with NTS-SOP 5413.

3. CONTAINMENT DESIGN AND EVALUATION. The sponsoring laboratory shall analyze site characterization data, prepare a containment design, and prepare and present a containment prospectus to the Containment Evaluation Panel in accordance with the "Containment Evaluation Panel Charter" and additional guidance as may be issued by the Containment Evaluation Panel.

4. EVENT SITE PREPARATION.

   a. The NTS contractors shall provide engineering design and construction support meeting the criteria of the sponsoring laboratory, as approved by the NTSO in accordance with NTS-SOP 6401.

   b. Under authority delegated by the DOE/NV Manager, the sponsoring laboratory shall provide technical direction to the contractor, as necessary, to meet their scientific requirements.

   c. For tests subject to treaty monitoring, the Director, EMND, in cooperation with the sponsoring laboratory Test Director, will ensure accomplishment of activities identified in the Coordinated Schedule such as:

      (1) Pretest inspections of verification equipment.

      (2) Required logging, coring, and surveying activities.

      (3) Installation of verifying party equipment and facilities at ground zero and the Control Point.

      (4) Setup and testing of anti-intrusiveness and trigger conditioner devices for verifying party data recording facilities.

5. DIAGNOSTICS, TIMING, AND CONTROL.

   a. The NTS contractor providing technical support for the preparation and installation of diagnostics and timing and control systems shall work to the technical criteria of the sponsoring laboratory.

b. Under authority delegated by the DOE/NV Manager, the sponsoring laboratory Test Director shall provide technical direction to the contractor, as necessary, to meet the laboratories' scientific requirements.

c. The Test Director shall ensure that the installation and operation of timing and control systems are in accordance with the approved Nuclear Explosive Safety Studies and NTS-SOP 5610.

6. RECEIPT, ASSEMBLY, DISASSEMBLY, AND STORAGE.

a. No receipt, assembly, disassembly, modification, or storage of nuclear explosives or special nuclear material may occur on the NTS without authorization of the Assistant Manager for Operations in accordance with NTS-SOP 5613.

b. The sponsoring laboratory shall ensure the storage facility meets all requirements of the approved Nuclear Explosive Safety Studies of Assembly, Storage, and Transportation, and NTS-SOP 5610.

c. Accountability of the nuclear material will be performed by the Safeguards and Security Division nuclear materials representative in accordance with NTS-SOP 5612, the "Material Control and Accountability Plan," and the Material Control and Accountability Standard Operating Procedures.

d. The sponsoring laboratory shall assemble the nuclear explosive in accordance with the approved Nuclear Explosive Safety Studies.

e. Assembly of nuclear explosives not known to be one-point safe, shall be authorized by the Assistant Manager for Operations upon receipt of approval by DP-20.

7. NUCLEAR EXPLOSIVE DELIVERY AND INSERTION.

a. Prior to delivery of the nuclear explosive to the event site, the Test Director shall prepare and submit to the Safeguards and Security Division for approval, a Ground Zero Security Plan which conforms to the requirements of the "DOE/NV Master Safeguards and Security Agreement."

b. Prior to delivery of the nuclear explosive to the event site, the NTS security contractor shall prepare and submit to the Safeguards and Security Division for approval, a convoy plan which conforms to the requirements of the "Memorandum of Understanding for Convoys of Nuclear Test Devices on the Nevada Test Site and the Memorandum of Understanding for Intercompound Moves in Area 27."

c. The sponsoring laboratory shall ensure that delivery and insertion are in accordance with the approved "Nuclear Explosive Safety Master Study of the Joint LANL/LLNL AS&T Operations at the Nevada Test Site," "Nuclear Explosive Safety Master Study of the LLNL/LANL I&E at the Nevada Test Site," the "As-Built" review, and NTS-SOP 5610.

d. Prior to delivery of the nuclear explosive to the event site, the laboratory Test Director shall obtain permission from the Test Controller to emplace the nuclear explosive in accordance with NTS-SOP 5614.

e. For tests subject to treaty monitoring, the Arms Control and Nonproliferation Division will ensure that the On-Site Inspection Agency and designated personnel are permitted to perform measurements of the device canister.

8. EMPLACEMENT AND STEMMING.

a. NTS contractors shall conduct emplacement and stemming operations at the technical direction of the laboratory Test Director as authorized in accordance with NTS-SOPs 6401 and 6405.

b. Downhole emplacement of the nuclear explosive shall be in accordance with the approved "Nuclear Explosive Safety Master Study of the Joint LANL/LLNL AS&T Operations at the Nevada Test Site," "Nuclear Explosive Safety Master Study of the LLNL/LANL I&E at the Nevada Test Site," and NTS-SOP 5610.

c. Prior to stemming, the laboratory Test Director shall obtain permission from the Test Controller to place the nuclear explosive in an irretrievable position in accordance with NTS-SOP 5614.

d. Approved stemming plan of the emplacement hole shall be in accordance with the approved stemming plan as presented to the Containment Evaluation Panel.

e. For tests subject to treaty monitoring, the Director, EMND, will ensure that the On-Site Inspection Agency and designated personnel are permitted to:

(1) Observe downhole emplacement of the canister and confirm final canister location.

(2) Observe the stemming process and collect samples of stemming material.

9. ON-SITE AND OFF-SITE MONITORING.

a. The NTS management and operating contractor shall field a radiological monitoring network to support execution of each nuclear test. This network shall consist of:

(1) A temporary Remote Area Monitoring System array at ground zero to conform to the criteria of the sponsoring laboratory.

(2) A permanent on-site system including the Remote Area Monitoring System, air samplers, noble gas samplers, tritium samplers, and thermoluminescent dosimeters.

b. The Director, EPA/ORIA, shall ensure that their off-site radiological surveillance networks are ready to support test execution.

c. The Director, NOAA ARL/SORD, shall ensure their meteorological monitoring systems are ready to support test execution.

d. The Resident Manager, Sandia National Laboratories (SNL), shall ensure that the permanently installed NTS geophone network is ready to support test execution.

e. The NTS management and operating contractor shall install a closed-circuit television monitoring system of the ground zero area. Prior to installation, location and coverage shall be approved by the Team Leader, NTS Operations Team, OMD; and the Program Manager, Safeguards and NTS Security Program, Safeguards and Security Division. The system shall be operational prior to device delivery. The contractor shall further ensure that the airborne closed-circuit television system is ready to support test execution.

f. The NTS security contractor shall ensure that monitoring systems required by the approved Intruder Interdiction Action Plan are in place and operational.

g. For tests subject to treaty monitoring, the Director, EMND, will ensure that the On-Site Inspection Agency designated seismic stations are provided the required timing and schedule notifications.

10. TEST EXECUTION.

a. Approximately 2 weeks prior to scheduled test execution, the Test Operations Officer shall submit a DOE Test Controller's Operations and Security Plan to the Test Controller for approval.

b. The Test Controller's Operations and Security Plan shall ensure compliance with the current Deputy DP-20's written policy and

direction, and the DOE/NV Manager's written directions. This plan shall address the following:

(1) Test Location.

(2) Identification of Key Personnel.

(3) Radiological Safety Delegation.

(4) Planning and Safety Reviews.

(5) Manned and Stay-In Stations.

(6) Aircraft Participation (Aerial tracking/Sampling).

(7) Closed-Circuit Television.

(8) Geophones.

(9) Area Control Procedures.

(10) Effluent Release Reporting Requirements.

(11) Protection of Facilities and Equipment.

(12) Assignment and Schedule of Activities.

(13) Security Operations.

c. All participating organizations shall ensure that their responsibilities and activities assigned in the Test Controller's Operations and Security Plan are completed as scheduled and reported to the Test Controller.

d. The Test Operations Officer shall coordinate these activities and reports.

e. For tests subject to treaty monitoring, the Director, EMND, will ensure that:

(1) The Test Controller is apprised of conditions and limitations imposed by the treaty.

(2) The required notifications are provided to the On-Site Inspection Agency designated personnel.

(3) The On-Site Inspection Agency designated personnel are included and accounted for in emergency plans and procedures.

11. ARMING AND FIRING.

a. The Test Director shall ensure that nuclear explosive arming and firing is conducted in accordance with approved procedures contained in the "Nuclear Explosive Safety Master Study of LANL Timing & Firing of Nuclear Explosives at the Nevada Test Site," "Nuclear Explosive Safety Study of the LLNL Arming & Firing and Timing & Control System and Operations at the Nevada Test Site," and NTS-SOP 5610.

b. Prearming activities may not proceed until authorized by the Test Controller.

c. The countdown sequence may not proceed until a zero time has been established and permission to fire has been granted by the Test Controller.

d. Unless stopped by the Test Director for technical reasons or the Test Controller for any reason, the programmed countdown sequence normally will continue until zero time.

e. For tests subject to treaty monitoring, the verification representative will ensure that the On-Site Inspection Agency designated personnel are provided appropriate dry run schedules and timing signals.

12. REENTRY.

a. The Test Director shall prepare a reentry plan. This plan shall be presented for approval to the Test Controller and Scientific Advisory Panel at the D-1 planning meeting.

b. When deemed safe and based upon monitored data, predictions of collapse, and recommendations of the Test Director and Scientific Advisory Panel, the Test Controller shall authorize reentry into the event site.

c. The Test Director shall ensure that the reentry is in accordance with the approved reentry plan.

d. When deemed safe and appropriate, the Test Controller shall open the forward areas of the NTS for normal work and return control of the NTS to the Director, NTSO.

e. For tests subject to treaty monitoring, the Verification Liaison Officer will ensure that the Test Controller is aware of treaty requirements and that the On-Site Inspection Agency designated personnel treaty rights are satisfied during reentry.

13. POST TEST ACTIVITIES.

a. NTS contractors shall perform postshot drilling activities to meet the criteria of the sponsoring laboratory as authorized in accordance with NTS-SOPs 6401 and 6405.

b. Laboratory and contractor radiological procedures shall be in conformance with NVO/YMP Radiological Control Manual, Revision 1, dated 9-2-94.

c. For tests subject to treaty monitoring, the Director, EMND, will ensure that:

(1) All required data and other protocol-related information is provided to the On-Site Inspection Agency designated personnel.

(2) Post test inspections, movement, storage, and shipment of the On-Site Inspection Agency designated personnel equipment are accomplished.

14. EVENT SITE RESTORATION.

a. When use of the event site is no longer required by the sponsoring laboratory, the site shall be restored to meet the criteria of NTS-SOP 6405.

b. Upon completion of restoration, control of the event site will be returned to DOE in accordance with NTS-SOP 6405.

CHAPTER III

READINESS REVIEW REQUIREMENTS

1. PROGRAMMATIC REVIEW AND APPROVAL. Each year the Secretary of Energy proposes a program of nuclear testing for the upcoming year. This is submitted to the National Security Council for review. Based on review and recommendation by the National Security Council, the President approves each test in a series by name. Based on Presidential approval, DP-20 authorizes each test series and provides additional guidance and direction to the DOE/NV Manager. The Director, OMD, reviews each test on the Master Test Schedule to ensure Presidential programmatic approval.

2. VERIFICATION REVIEW. The Director, EMND, shall review each test on the Master Test Schedule to ensure compliance with the Threshold Test Ban Treaty notification requirements.

3. NUCLEAR EXPLOSIVE SAFETY STUDIES/SURVEYS.

   a. For each scheduled test, the Director, Nuclear Explosive Safety Division, and the sponsoring laboratory conduct a Nuclear Explosive Safety Study/Survey in accordance with DOE and NV Orders 5610.10 and 5610.11A. This study/survey is required to be approved and all issues resolved prior to conducting any nuclear explosive operation.

   b. The Director, Nuclear Explosive Safety Division, will ensure an "As-Built" review is conducted following the assembly of the nuclear explosive. This review will verify the nuclear explosive was assembled in accordance with the approved Nuclear Explosive Safety Study/Survey.

   c. The Director, Nuclear Explosive Safety Division, will ensure field follow-up of nuclear explosive safety reviews to monitor conformance with approved nuclear explosive safety procedures, study/survey recommendations, and safety rules.

4. CONTAINMENT EVALUATION.

   a. A review of the Containment Evaluation Panel prospectus is conducted with the USGS, DOE/NV staff, and sponsoring laboratory prior to the Containment Evaluation Panel meeting to resolve any geological issues and suggest additional matters that may need to be addressed by the Containment Evaluation Panel.

   b. During the Containment Evaluation Panel meeting, observer organizations, including the USGS and the NTS engineering contractor,

obtain, analyze, and present information and data relating to construction, rock properties, geology, and hydrology. A panel of independent containment experts, chartered by the Manager, categorize the nuclear event based on presentations by the sponsoring laboratory and by reviewing the Containment Evaluation Panel prospectus.

c. Each member shall conduct an independent evaluation of containment and provide the Chairman with a written categorization statement. These statements and a recommendation by the Chairman shall be forwarded to the DOE/NV Manager.

5. HYDROLOGY REVIEWS.

a. The USGS prepares a USGS Hydrologic Data Summary based on the geology of the site. The Hydrologic Data Summary includes a description of the anticipated groundwater aquifers which could be impacted by radionuclides generated from the nuclear event and aquitards that may impede and direct groundwater flow. The regional water table evaluation and local anomalies in water levels are used to predict drilling conditions.

b. The sponsoring laboratory submits their own Geologic Data Summary and Hydrologic Data Summary to DOE/NV.

c. This data is reviewed by geologists and hydrologists from the USGS, OMD, and the Environmental Restoration Division for compliance with NTS-SOP 5417, and then submitted for approval for hole construction to the Assistant Manager for Operations.

6. CONSTRUCTION REVIEWS.

a. All event site designs and construction drawings are reviewed and approved by the NTSO in accordance with NTS-SOP 6401.

b. The NTS architect-engineering contractor provides independent Title III services of all event site construction.

c. The NTS Office conducts field reviews of construction in progress to ensure compliance with all construction standards, approved plans and specifications, and other requirements.

7. THRESHOLD TREATY REVIEW.

a. For nuclear tests with design yields greater than 125 kilotons, the sponsoring laboratory will present the design of the nuclear explosive to the Threshold Treaty Review Panel for analysis.

b. The Threshold Treaty Review Panel shall determine if the design yield is within the limits of the Threshold Test Ban Treaty and makes recommendations to the DOE/NV Manager.

8. GROUND MOTION AND ATMOSPHERIC OVERPRESSURE REVIEW.

a. The NTS architect-engineering contractor shall make calculations of expected ground motion and prediction of damage to the NTS infrastructure. This data is submitted to the OMD and the NTS Office for review. Based on these reviews, the Director, OMD, shall recommend, and the Director, NTS Office, shall direct actions to mitigate expected damage.

b. The OMD shall independently calculate off-site ground motion. Based on predicted off-site ground motion, the Director, OMD, shall recommend to the DOE/NV Manager an announcement policy for the proposed test.

c. The OMD shall independently calculate atmospheric overpressure due to the nuclear test. Based on predicted overpressures, the Director, OMD, shall recommend aviation safety measures to the Test Controller.

9. ENVIRONMENTAL REVIEW.

a. The NTS Office shall review laboratory criteria for conformance with the environmental protection requirements of NTS-SOPs 5408, 5417, 5418, 5419, and 6405.

b. The Director, Environmental Protection Division, shall review the environmental documents of each nuclear test to ensure that the proposed test is consistent with provisions of the current "Nevada Test Site Environmental Impact Statement."

10. SECURITY REVIEWS.

a. Prior to arrival at the NTS of nuclear explosives or components, the Safeguards and Security Division reviews the NTS security contractor station orders for compliance with the "DOE/NV Site Safeguards and Security Plan" and the "Memorandum of Agreement for Shipments of Nuclear Explosives to the NTS."

b. Prior to transportation of a nuclear explosive to the event site, the Safeguards and Security Division:

(1) Reviews and approves the laboratory Ground Zero Security Plan.

(2) Performs a security inspection of the event site to ensure compliance with the approved plan.

(3) Reviews the NTS security contractor convoy plan and stations orders to ensure compliance with the "Memorandum of Understanding for Convoys of Nuclear Test Devices on the Nevada Test Site and the Memorandum of Understanding for Intercompound Moves in Area 27."

(4) Ensures that the recommendations and provisions of the DOE/NV "Nuclear Explosive Safety Study of Security Operations at the Nevada Test Site" have been met.

11. REVIEW FOR AUTHORITY TO RECEIVE, ASSEMBLE, DISASSEMBLE, OR STORE NUCLEAR EXPLOSIVES. Prior to the arrival of nuclear explosives or special nuclear materials at the NTS and upon request from the sponsoring laboratory, the Test Scientific Officer shall:

a. Verify with the Director, Nuclear Explosive Safety Division, that applicable nuclear explosive safety requirements have been met.

b. Verify with the Director, Safeguards and Security Division, that applicable safeguards and security requirements have been met.

c. Prepare for the approval of the Assistant Manager for Operations, an authority letter in accordance with NTS-SOP 5613.

12. DETONATION AUTHORITY REVIEW.

a. For each nuclear test, the DOE/NV Manager shall request detonation authority from DP-20. The Detonation Authority Request package shall include the following:

(1) The Containment Evaluation Panel Chairman's recommendation.

(2) The Test Scientific Officer's containment summary.

(3) The categorization statement of each Containment Evaluation Panel member.

(4) The containment design prospectus.

(5) Certification of completion of nuclear explosive safety requirements.

(6) Summary of the Director, Environmental Protection Division, environmental review.

(7) Summary of the hydrology reviews.

(8) Recommended public announcement policy.

b. Upon receipt of the Detonation Authority Request package, DP-20 conducts an independent review of the proposed test prior to granting detonation authority.

13. REVIEW FOR AUTHORITY TO MOVE, EMPLACE, AND STEM NUCLEAR EXPLOSIVES. Prior to the delivery of nuclear explosives to the event site and upon request from the Test Director, the Director, OMD, shall:

a. Verify that DP-20 has granted detonation authority. If not, the Director, OMD, should so advise the Test Controller and request guidance before proceeding.

b. Verify the Test Director has been approved by the Manager and delegated authority to conduct the requested operation.

c. Verify with the Director, Safeguards and Security Division, that all safeguards and security requirements have been met.

d. Prepare a letter authorizing the sponsoring laboratory to move, emplace, and stem the nuclear explosive in accordance with NTS-SOP 5614 for approval by the Test Controller.

14. D-7 PLANNING AND SAFETY REVIEW. Approximately 1 week prior to scheduled test execution, the Test Controller and Scientific Advisory Panel shall conduct a review of operational plans and safety precautions to include:

a. Technical summary of the test.

b. Proposed reentry procedures, including:

(1) Medical response plans.

(2) Timing requirements.

(3) Geophone monitoring.

(4) Radio net requirements.

(5) Shrink points and hold locations.

(6) Radiological surveys.

(7) Electrical safety checks.

(8) Alarm procedures.

c. Seismic precautions, including:

(1) On-site personnel exclusion area.

(2) Off-site ground motion prediction and recommended actions.

d. Off-site conditions.

e. Weather considerations.

f. Applicable Memorandum of Understanding or other agreements.

g. Treaty monitoring requirements.

h. Remote Area Monitoring System status and recommendation.

i. Other safety interests.

j. Security interests.

k. Public affairs interests.

l. Proposed Test Control Center displays.

m. Post test procedures and duty personnel.

15. DRY RUNS.

a. Prior to the Test Director declaring technical readiness for the nuclear explosive to be delivered to the event site, the sponsoring laboratory shall conduct a successful dry run. This dry run shall include all applicable test organizations.

b. Prior to the Test Director requesting authority to prearm the nuclear explosive, the sponsoring laboratory shall conduct a successful final dry run.

16. ARMING AND FIRING CABLE CONFIRMATION. Prior to the D-1 Readiness Briefing, the sponsoring laboratory shall conduct a physical inspection of the arming and firing cables to ensure readiness.

17. D-1 PLANNING AND SAFETY REVIEW. On the morning before planned detonation, the Test Controller and Scientific Advisory Panel shall conduct a review of operational plans and safety precautions:

a. Test overview, including:

(1) Technical status.

(2) Location.

(3) Ground zero and trailer park layout.

(4) Ground zero Remote Area Monitoring System array.

(5) Reentry Plan.

(6) Postshot Drilling Procedures.

b. Area Control Plan, including:

(1) Closed areas.

(2) Controlled areas.

(3) Personnel numbers and locations.

(4) Manned and stay-in stations.

(5) Late exits.

(6) Intruder Interdiction.

c. Security interests.

d. Verification interests.

e. Add-on projects as required.

f. Post test manning assignments.

18. D-1 "AS-BUILT" CONTAINMENT REVIEW.

a. Prior to the D-1 Readiness Review, the Test Controller and Scientific Advisory Panel shall review the "As-Built" Containment Plan to ensure conformance to the approved plan as presented to the Containment Evaluation Panel. This shall consist of reviews and formal statements by independent containment scientists from both the LANL and the LLNL, the NTS management and operating contractor which emplaced the stemming, and the NTS architect-engineering contractor which conducted the independent Title III services of stemming emplacement.

b. If the Test Controller does not concur that the stemming has been emplaced in substantial conformance with the approved plan as presented to the Containment Evaluation Panel, the test shall be delayed and the matter referred back to the Containment Evaluation Panel.

c. A verbatim record of this review, the Scientific Advisory Panel deliberation and recommendation, and the Test Controller decision shall be made.

19. D-1 TECHNICAL REVIEW. Prior to the D-1 Readiness Review, the Test Controller and Scientific Advisory Panel shall receive a classified briefing of the significant technical aspects of the experiment from the Test Director. Based on this review and recommendation of the Scientific Advisory Panel, the Test Controller may authorize the test to proceed.

20. D-1 RANGE SAFETY REVIEW. Prior to the D-1 Readiness Review, the Test Controller and Scientific Advisory Panel shall receive a classified briefing of operations on the U.S. Air Force ranges adjacent to the NTS from the U.S. Air Force/DOE Liaison Officer. This briefing shall include an assurance that the U.S. Air Force is capable of evacuating or sheltering range personnel if required. Based on this review, the Test Controller may authorize the test to proceed.

21. D-1 READINESS REVIEW. On the day prior to the detonation, the Test Controller and Scientific Advisory Panel shall conduct a review of readiness for test execution. A verbatim record of this review, the Scientific Advisory Panel deliberation and recommendation, and the Test Controller decision shall be made. This readiness review shall address:

    a. Confirmation of technical readiness by the Test Director.

    b. NOAA ARL/SORD weather forecast.

    c. NOAA ARL/SORD prediction of radioactive fallout and the potential radiological exposure levels in the unlikely occurrence of a venting.

    d. EPA/Environmental Monitoring Systems Laboratory-Las Vegas off-site radiological safety preparations.

    e. DOE on-site radiological safety preparations.

    f. NTS logistical support readiness.

    g. Status of completed actions required by the Test Controller's Operations and Security Plan.

    h. Status of preparation for future actions required by the Test Controller's Operations and Security Plan.

    i. Area Control Plans, including:

        (1) Manned stations.

        (2) Stay-in stations.

        (3) Late exits.

j. Test support aircraft readiness.

22. D-DAY READINESS REVIEW.

a. On the day of planned detonation, the Test Controller and Scientific Advisory Panel shall conduct another review of readiness for test execution. A verbatim record of this review, the Scientific Advisory Panel deliberation and recommendation, and the Test Controller decision shall be made.

b. This review shall include all areas addressed in the D-1 Readiness Reviews with the addition of updated weather and fallout predictions and the Test Director's declaration of a successful final dry run.

c. Based on the recommendations of the Test Director and the Scientific Advisory Panel, the Test Controller may authorize prearming of the nuclear explosive.

d. Upon completion of prearming, the Test Controller shall ensure continued readiness in all respects prior to authorization to commence the countdown sequence.

CHAPTER IV

TRAINING AND QUALIFICATION REQUIREMENTS

1. The Assistant Manager for Operations shall identify key positions critical to the safe preparation and conduct of underground nuclear testing.

2. Each organization participating in the preparation, conduct, or posttest activities of an underground nuclear test shall ensure personnel assigned to identified key positions have a documented training and qualification program.

3. Training and qualification programs for personnel assigned to identified key positions shall identify:

   a. Any minimum prerequisites of education, knowledge, and experience necessary to enter into the position.

   b. Any required formal training courses or other education necessary for qualification.

   c. Any required activities to be performed or observed necessary for qualification.

   d. Any required readings or informal briefings necessary for qualification.

   e. Any required demonstration of knowledge, skill, or ability necessary for qualification.

   f. The means by which the accomplishments of paragraphs a through e above are documented. Other than required reading, these must be verified by an individual other than the person being qualified.

   g. For paragraphs b through e above, any periodic or requalification requirements.

   h. The official authorized to certify individuals to perform their functions.

   i. The means by which the individual will be certified to perform the functions upon their completion of all requirements. Such means may include written examinations, oral boards, recommendation of supervisor or manager, records review, or interview.

4. Each participating organization shall provide to the Director, OMD, who shall maintain in the event file:

   a. Identification of individuals assigned to key positions.

   b. Copies of each individual's certification as qualified to perform their assigned functions.

CHAPTER V

REPORTS

Reports listed below shall be prepared for each test, as required, or for each fiscal year test series upon its termination.

1. NATIONAL RESPONSE CENTER REPORT. Within 8 minutes of detonation, the Test Controller shall notify the National Response Center of detonation by telephone, as required by the Comprehensive Environmental Response, Compensation, and Liability Act.

2. DOE/NV COMPLETION REPORT. All input is to be furnished to the Director, Information Management Division, DOE/NV, no later than the first working day in November following the close of each fiscal year test series.

3. OPERATIONAL REPORTS. An H-48 hour advisory and a posttest report, along with other documentation, as required, will be submitted by the NTS Operations Team at Control Point 1.

4. PUBLIC INFORMATION REPORTS. Director, PAO, will prepare and publish DOE/NV-209, "Announced United States Nuclear Tests."

5. RADIOACTIVE RELEASE REPORTS. The Assistant Manager for Environment, Safety, Security, and Health will furnish and update a report on a quarterly basis and provide a yearly summary of all types of releases of radioactivity to DP-20.

6. TREATY VERIFICATION AFTER-ACTION REPORT. In accordance with the operations plan, "Conduct of Verification Activities at the NTS," an After Action Report for each verification event will be developed at the conclusion of the event. Problem areas and lessons learned will be included in the report.

7. VERIFICATION REPORTS. Nuclear testing treaty protocols require certain notifications and reports to be provided by the Verifying and Testing Parties. A record of these notifications will be maintained by the EMND.

CHAPTER VI

TEST READINESS

1. PURPOSE. Provide policy and direction for conduct of the DOE/NV Test Readiness Program and identify activities designed to maintain a capability to comply with requirements in this Order and DOE Stockpile Stewardship and Management Plan should treaty prohibited nuclear testing at the Nevada Test Site be resumed.

2. BACKGROUND ON THE REQUIREMENT FOR UNDERGROUND NUCLEAR TEST READINESS.

   a. The last U.S. sponsored underground test, which was conducted September 23, 1992, preceded a legislatively directed moratorium. On January 30, 1995, the President's National Security Advisor announced that the President had decided to extend the moratorium until a Comprehensive Test Ban Treaty enters into force, on the assumption that it will be signed before September 30, 1996. A Presidential Directive requires DOE to maintain the capability to conduct a nuclear test within 24 to 36 months of a request for resumption from the President.

   b. The DOE approach achieves the maintenance of nuclear test readiness by conducting a science-based experimental program which provides data necessary for maintenance of the stockpile and contributes to readiness. In specific areas where capabilities are not sufficiently exercised by defense experimentation, a mixture of experimentation and limited exercises will be required to fully meet the readiness mandate.

3. ANNUAL EXERCISE/ACTIVITY.

   a. On an annual basis, and with the cooperation of the national laboratory managers and technical staff, a plan for conduct of dynamic experiments at the NTS will be developed. These will be high explosives experiments which may or may not include special nuclear materials. The Exercise/Activity Plan, will also identify test-readiness exercises which will be conducted, including those to be an integral part of the schedule experiments.

   b. The Annual Exercise/Activity Plan will include the following where applicable:

      (1) Technical objectives of the experiments.

      (2) Relationship to Defense Programs Missions.

      (3) Scheduled dates.

(4) Projection's to maintain safety related capabilities associated with underground nuclear testing.

c. In the absence of approved experiments which adequately exercise all facets of underground nuclear testing, at least twice per year, a full-scale exercise will be carried out by the Nuclear Test Organization. Ideally, test-readiness training for all facets of nuclear testing will be provided through these exercises, and, when feasible, the exercise will be conducted as an integrated part of dynamic experiments.

d. In the absense of approved experiments which adequately exercise all facets of underground nuclear testing, at least on a quarterly basis, exercises of a more local and limited scope will be conducted for all the major functional areas. Dynamic experiments/integrated exercises will normally satisfy this requirement. In some cases, operations associates with other Nevada Test Site programs can also provide the required readiness training.

4. FUNCTIONAL AREAS. Chapter II of this Order identifies 14 testing requirements for preparation and conduct of nuclear tests. From these ten areas of activity, referred to as Functional Areas, were selected/formed to describe the operational activities conducted by the Nuclear Test Organization which need to be reviewed and exercised to maintain a test-readiness capability. Documentation of readiness activities and status is accomplished using the following Functional Areas:

a. Containment.

b. Security.

c. Assembly.

d. Storage and Transportation.

e. Insertion and Emplacement.

f. Timing and Control.

g. Arming and Firing.

h. Diagnostics.

i. Test Control Center Activities (D-1 and D-Day).

j. Postshot Drilling.

5. POSITIONS FOR THE SAFE EXECUTION OF NUCLEAR TEST ACTIVITIES.

a. The Critical Positions within the Nuclear Test Organization which are required for the safe preparation and conduct of nuclear testing have been identified. Critical Position personnel are trained, qualified, and documented by the organizations which make up the NTO.

b. The Critical Positions include a subset of positions which are identified by DOE/NV as "Key Positions" for conducting the test program safely. Individuals assigned to Key Positions are qualified and certified by the NTO as indicated in Chapter IV of this Order. DOE/NV maintains a Job Task Analysis (JTA) for each Key Position. The Key Positions are identified below:

KEY POSITIONS

DOE HEADQUARTERS

1. DOE/HQ Deputy Assistant Secretary for Military Application and Stockpile Support

2. DOE/HQ Deputy Assistant Secretary for Research and Development

DOE/NV

1. Air Force Liaison Officer
2. Air Operations Officer
3. Weather Event Support Meteorologist (ARL/SORD)
4. Event Radiation Fallout Support Specialist (ARL/SORD)
5. Containment Evaluation Panel
6. Off-Site Radiological Safety Program Officer (EPA)
7. Off-Site Radiological Safety Officer (EPA)
8. Health Physics Advisor
9. Medical Advisor (Consultant)
10. Meteorological Advisor (ARL/SORD)
11. Nuclear Explosives Safety Engineer
12. Radiological Operations Officer
13. Security Advisor
14. Test Controller
15. Test Operations Officer

SUPPORT CONTRACTOR

1. Control Room Technician
2. EG&G/EM Red Shack Technician
3. Drilling Superintendent
4. Downhole Crane Operator
5. Downhold Superintendent

WSI

1. Convoy Commander
2. Event Lieutenant

NATIONAL LABORATORIES--LANL/LLNL/SNL

1.	Arming and Firing Technician	SNL
2.	Assembly Technician	LANL/LLNL
3.	Construction Engineer	LANL/LLNL
4.	Containment Advisor	LANL/LLNL/SNL
5.	Containment Scientist	LANL/LLNL
6.	Device Engineer	LANL/LLNL
7.	Drilling Engineer	LANL/LLNL
8.	Health Physicist	LANL/LLNL/SNL
9.	Nuclear Explosive Assembly Facility Coordinator	LANL/LLNL
10.	Safety Analytical Engineer	LANL/LLNL
11.	Scientific Advisor (chairman)	LANL/LLNL
12.	Test Director	LANL/LLNL
13.	Timing & Firing Engineer	LANL

DEFENSE NUCLEAR AGENCY

1. Construction Engineer
2. Containment Scientist
3. Health Physicist
4. Test Group Director

c. Dynamic experiments and/or readiness exercises will provide training for Critical Position personnel to the maximum feasible extent, and the participation (by Functional Area), training, and status of Key Position personnel will be documented by DOE/NV.

6. Exercise/Readiness Activity Planning.

a. At least one month prior to the date of exercise/activity, an Exercise Plan will be published. When the exercise is conducted as an integral part of an experiment an experiment/exercise plan will be developed. The principal planning objectives will be to ensure:

(1) Each exercise is planned and conducted in a manner which maintains test readiness capability of operations personnel facilities hardware, software, management systems, and controls.

(2) Documentation is maintained to validate exercise objectives.

(3) Opportunities for improvement and lessons learned are identified.

b. Exercise/activity plans will contain the following:

(1) Purpose.

(2) Scope.

(3) Objective(s).

(4) Responsibilities.

(5) Description.

(6) Assignment of Safety Coordination Responsibility.

(7) Permits and Authorizations Required (if any).

(8) Personnel Participation, Training, and Assessment.

(a) Key Position Individuals to Maintain Qualifications.

(b) Individuals in Process of Qualification for a Key Position.

(9) Associated Facilities, Hardware, and Software Systems to be Exercised.

(10) Functional Areas Exercised.

(11) Procedures and Checklists.

(a) Test Director's checklist.

(b) Other Checklists.

7. Exercise/Activity Completion Reports. Within two months following each exercise/activity, which will be documented for readiness, a completion report will be published. The exercise/activity completion report will include the following:

a. Summary of Exercise(s)/Activities.

b. Summary of Exercise/Activity Results.

c. Evaluation of Exercise/Activity objectives.

d. Personnel Participation and Training.

(1) Completed Key Position Training/Requalification.

(2) Individuals in Process of Qualifications.

(3) Other Critical Position Personnel Participation and Training.

e. Deviations/Waivers from Exercise/Activity Plan, Policies, Other Approved Plans, or Procedures.

f. Unexpected Events/Unusual Occurrences (DOE Order 5000.3B).

g. Problems Areas/Issues of Concern Discovered Which Were Resolved on the Spot.

h. Opportunities for Improvement which should be Reviewed for Cause and Possible Corrective Action.

i. Lessons Learned.

8. Annual Test Readiness Completion Report. At the end of the calendar year, a completion report will be published which identifies and summarizes significant readiness activities to include the following:

a. Programs, operations, experiments, and exercises which contributed to test readiness.

b. Critical Functional Areas which were active/exercised and a qualitative assessment of capabilities within these areas.

c. Key Positions which were active/exercised and a qualitative assessment of the status, technical competency, and adequacy of the personnel qualified/certified to perform in these positions.

d. Job Task Analyses for Key Positions and determination of currency and sufficiency.

e. Lessons Learned during technical activities and exercises.

f. Functional Areas, Key Positions, and other readiness considerations which require improvement and will be addressed in the next Annual Exercise/Activity Plan.

CHAPTER VII

REFERENCES

1. DOE AND NV ORDERS.

   a. NV Order 11XB.1C, COMMITTEES AND PANELS HANDBOOK, of 11-30-94.

   b. NV Order 5480.11, RADIATION PROTECTION FOR OCCUPATIONAL WORKERS, of 9-28-94.

   c. DOE and NV Orders 5484.1, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, of 2-24-81, and 6-15-82 respectively.

   d. DOE and NV Orders 5610.10, NUCLEAR EXPLOSIVE AND WEAPON SAFETY PROGRAM, of 10-10-90, and 3-8-94 respectively.

   e. DOE Order 5610.11A and NV Order 5610.11A, NUCLEAR EXPLOSIVE SAFETY, of 10-10-90 and 2-9-93, respectively.

2. NTS STANDARD OPERATING PROCEDURES.

   a. NTS-SOP 1102, NUCLEAR TEST ORGANIZATION, of 7-5-94.

   b. NTS-SOP 1104, MISSION STATEMENTS--DEFENSE NUCLEAR AGENCY AND NATIONAL LABORATORIES, of 3-16-94.

   c. NTS-SOP 1106, TEST MANAGEMENT INFORMATION CENTER, of 7-24-95.

   d. NTS-SOP 5408, ENVIRONMENTAL PROTECTION AND REGULATORY COMPLIANCE, of 9-16-91.

   e. NTS-SOP 5413, CHARACTERIZATION OF EVENT SITES, of 9-3-93.

   f. NTS-SOP 5417, PROTECTION OF GROUNDWATERS AT NUCLEAR TEST LOCATIONS, of 8-3-93.

   g. NTS-SOP 5418, PROTECTION OF ENDANGERED SPECIES AND CULTURE RESOURCES, of 9-23-94.

   h. NTS-SOP 5419, NATIONAL ENVIRONMENTAL POLICY ACT, of 5-29-92.

   i. NTS-SOP 5501, EMERGENCY PREPAREDNESS, of 2-14-94.

   j. NTS-SOP 5610, NEVADA TEST SITE NUCLEAR EXPLOSIVE AND WEAPON SAFETY PROGRAM, of 11-16-95.

CHAPTER VII

REFERENCES
(Continued)

k. NTS-SOP 5612, SAFEGUARDS AND NUCLEAR MATERIALS MANAGEMENT, of 5-22-95.

l. NTS-SOP 5613, NEVADA TEST SITE PROCEDURE FOR AUTHORIZATION OF RECEIPT, ASSEMBLY, DISASSEMBLY, AND STORAGE OF NUCLEAR EXPLOSIVES, of 12-22-93.

m. NTS-SOP 5614, MOVEMENT, EMPLACEMENT, AND STEMMING OF NUCLEAR EXPLOSIVES, of 7-17-95.

n. NTS-SOP 6401, ENGINEERING, CONSTRUCTION, AND SUPPORT SERVICES, of 2-4-94.

o. NTS-SOP 6405, CONTROL OF NUCLEAR TEST AREAS, of 8-10-95.

3. OTHER.

a. Atomic Energy Act of 1954, as amended.

b. Clean Air Act of 1955, Public Law No. 95-95, of 1977.

c. Comprehensive Environmental Response, Compensation and Liability Act, Public Law No. 96-510, of 12-11-80.

d. Containment Evaluation Panel Charter, of 7-1-92.

e. Delegation of Authority to the Test Controller, (memorandum, Manager to the Test Controllers), of 5-1-92.

f. DOE/NV Site Safeguards and Security Plan, of 8-1-95.

g. DOE/NV-209 (Revision 13), Announced United States Nuclear Tests, of 5-93.

h. DOE Reorganization Act, Public Law 95-91, of 8-4-77.

i. Energy Reorganization Act of 1974.

j. Environmental Protection Agency Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, of 5-92.

k. Limited Test Ban Treaty, of 8-63.

CHAPTER VII

REFERENCES
(Continued)

l. Material Control and Accountability Plan, of 4-8-93.

m. Memorandum of Agreement for Shipments of Nuclear Explosives to the Nevada Test Site, of 12-14-89.

n. Memorandum of Understanding for Convoys of Nuclear Test Devices on the Nevada Test Site and Memorandum of Understanding for Inter-compound Moves in Area 27, of 12-19-92.

o. National Environmental Policy Act of 1969, Public Law No. 91-190.

p. Nevada Test Site Environmental Impact Statement, of 1977.

q. Nuclear Explosive Safety Master Study of the Los Alamos National Laboratory/Lawrence Livermore National Laboratory Installation and Emplacement at the Nevada Test Site, of 7-26-94.

r. Nuclear Explosive Safety Study of the Lawrence Livermore National Laboratory Arming and Firing and Timing and Control System and Operations at the Nevada Test Site, of 11-23-92.

s. Nuclear Explosive Safety Study of the Joint Los Alamos National Laboratory/Lawrence Livermore National Laboratory Assembly, Storage, and Transportation, of 5-6-94.

t. Nuclear Explosive Safety Study of the Los Alamos National Laboratory Assembly, Disassembly, Storage, and Transportation, of 7-10-85.

u. Nuclear Explosive Master Safety Study of Security Operations at the Nevada Test Site, of 3-24-95

v. Operations Plan for Conduct of Verification Activities at the Nevada Test Site, of 9-92.

w. Peaceful Nuclear Explosions Treaty, of 5-76 and its Protocol, of 6-90.

x. Threshold Test Ban Treaty, of 7-74, and its Protocol, of 6-90.

CHAPTER VIII

DEFINITIONS

1. ANTI-INTRUSIVENESS AND TRIGGER CONDITIONER DEVICES. Electronic devices installed in Russian hydrodynamic yield sensor cables at the NTS which prevent the measurement and recording of sensitive device-related information found in the initial electromagnetic pulse signals emanating from a nuclear explosion.

2. AS-BUILT. A drawing or other record of a completed assembly or construction which indicates final condition as actually built including all differences from the approved design.

3. CERTIFICATION. The act of determining, verifying, and attesting in writing to the qualifications of personnel, processes, procedures, or items in accordance with specified requirements.

4. DESIGNATED PERSONNEL. The official designation for Russian personnel present in the U.S. for the specific purpose of monitoring U.S. nuclear tests under terms of the Threshold Test Ban Treaty.

5. ENVIRONMENT, SAFETY, AND HEALTH/RADIOLOGICAL SAFETY COORDINATION RESPONSIBILITY. Operational activities at the NTS are diverse involving the application of many different skills and occupational specialties and are often widely dispersed over a large geographical area. Several different organizations frequently perform work either as a closely integrated team or concurrently at any one location. In order to ensure that the appropriate procedures and policies are uniformly considered and applied by all of the program participants, one organization is assigned overall environment, safety, and health and radiological safety coordination responsibilities for that specific area or facility.

6. LEAD FEDERAL AGENCY OFFICIAL. The Lead Federal Agency is the team established in the Federal Radiological Emergency Response Plan for the agency having lead responsibility to monitor and assess impacts from a radiological release. For a release at the NTS, DOE/NV is the Lead Federal Agency and the DOE/NV Manager, or his designee, is the Lead Federal Agency Official.

7. NUCLEAR EXPLOSIVE. Any assembly containing fissionable and/or fusionable materials and main charge high explosive parts or propellants that may be capable of producing a nuclear detonation.

8. NUCLEAR EXPLOSIVE OPERATIONS. Those activities which require access to a nuclear explosive such as transportation, storage, assembly, disassembly, modification, and repair.

CHAPTER VIII

DEFINITIONS
(Continued)

9. ON-SITE INSPECTION AGENCY. The U.S. Department of Defense organization assigned responsibility for implementing U.S. Arms Control Treaties. They have overall responsibility to oversee and coordinate Russian treaty monitoring activities at the NTS under terms of the Threshold Test Ban Treaty.

10. QUALIFICATION. The characteristics or abilities gained through education, training, or experience, as measured against established requirements, such as standards or tests, that qualify an individual to perform a required function.

11. TEST EXECUTION PERIOD. The period of time following the completion of the initial D-1 readiness briefing through the time when reentry into the event site is complete and the Test Controller announces that all work forces may return to normal work areas.

12. THRESHOLD TEST BAN TREATY AND ITS PROTOCOL, of 6-1-90. Limits the yield of U.S. underground nuclear tests to 150 kilotons and provides for on-site monitoring of certain U.S. tests by Russian designated personnel.

13. TITLE III SERVICES. Those activities required to ensure that the project is constructed in accordance with the plans and specifications (construction inspection), and that the quality of materials and workmanship is consistent with the requirements of the project (materials testing).

14. VENTING. A dynamic release to the atmosphere of radioactive gases and particulates within minutes after the detonation which does not continue for hours. It therefore involves the release of predominately short-lived nuclides producing a relatively high initial specific activity.

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